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THE PHYSIOLOGY OF WORK

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CHICAGO

The industries of our country have a tremendous task to perform. The successful accomplishment of this task depends primarily on the morale and physical fitness of our man power. Pearl Harbor and the fact that our sons are fighting constitute sufficient motivation for the maintenance of a high morale. It is the province of those charged with the maintenance of industrial health to increase and to conserve the physical fitness of the personnel in the office and in the factory. It is for this reason that I accepted the invitation to discuss "the physiology of work" before this group of physicians, whose responsibility in the emergency that confronts us is large.

Even in ordinary times and apart from any sense of social responsibility, the industrial physician well knows that attention devoted to the health and well-being of executives and laborers is in the interest of efficient management.

In physics and engineering "work" is reduced to a simple formula: Work is done when a force moves a mass against resistance, or when one form of energy is transformed into another. Such transformation is an essential feature of all physiologic processes. Interpreted in physiologic terms, this mechanical conception of work means that if there is no increase in the metabolic rate no work has been performed. However, it is known that when a person performs work in the ordinary sense a constant ratio between energy expenditure and output is not found, even when "muscular work" is performed. This is because the efficiency of the muscular movements varies. The mechanical concept of work is adequate when the mechanical aspects or work is considered. It is also adequate when one desires to calculate approximately the calories of food required to maintain the body when a known amount of muscular work is to be performed. The mechanical concept of work is inadequate when one deals with the output of muscular work as measured by accomplishment, because such factors as muscular efficiency, incentive, staleness and feeling tone are concerned. It is also inadequate when the product of the work arises chiefly from mental processes. Mental effort such as addition and multiplication produces only a small increase in metabolic rate. Finally, the state of mind and the state of nutrition and health of the worker are immutably linked with performance. The work of man cannot be reduced to a simple formula.

By definition, any one interested in work must be interested in accomplishment, efficiency, fatigue and recuperation. They are all proportional to the length, the rate and the difficulty of the task. Fatigue means a decrease in either organic state, output or subjective feeling tone, which results from previous activity, and is relieved by rest. It is to be noted that the man who complains of feeling tired, though he has done no work, is arbitrarily omitted from this definition. According to my views, such a person is either mentally or physically sick or he needs a little "warming up" exercise.

On the basis of the organic changes in the body resulting from muscular work, different degrees of work are recognized. These will be briefly discussed in turn.

MAXIMAL MUSCULAR WORK

In maximal work the steady state of the body is never reached or cannot be maintained continuously. If continued, the result is breakdown or collapse. Maximal work is defined as that which yields an average metabolic rate of eight or more times the basal metabolic rate. (The basal metabolic rate is 1,600-1,800 calories.) For short periods muscular work may be done at a rate which increases the metabolic rate twenty times above the basal rate. Maximal work is frequently performed in sports or in the laboratory; it is rarely required in industry.

In maximal work the need for "warming up" for greatest accomplishment is generally recognized. The need for rest periods is imperative. At this critical level of work the margin of safety is small. It has been found that the need and preferential utilization of carbohydrate is important in maximal work. Carbohydrate requires 6 per cent less oxygen for its combustion than fat. Except in emergencies, few persons will work at such an intensity as to produce a hyperpyrexia and a critically low blood sugar. Few persons will do even submaximal work to the point at which the plateau value of the heart rate suddenly breaks and rises to the maximal value of impending collapse.

HARD OR HEAVY MUSCULAR WORK

Heavy work is arbitrarily defined as that amount which yields a mean metabolic rate of from three to eight times the basal metabolic rate. It has been suggested that an average of eight times the basal metabolic rate is as much as can be maintained for eight hours. This category of work includes many of the heavy manual jobs in agriculture, building trades, mining, heavy industry and forced marches with a heavy load.

In the performance of heavy work a steady state of the heart rate and output, blood pressure, pulmonary venti-

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From the Department of Physiology and Pharmacology, Northwestern University Medical School.

lation and body temperature is soon attained. However, the person performing heavy work has a reduced margin of safety in regard to heat dissipation and cardiovascular function. The temperature, humidity and movement of the air about him are of vital concern, as is the loss of sodium chloride and water through perspiration. Excessive perspiration calls for extra salt in the diet and drinking water. Clothing is also important, because when the limit of heat dissipation is approached breakdown is imminent.

Heavy work performed over an eight hour period requires for maintenance a diet containing from 3,500 to 5,000 calories, or from 1,800 to 4,800 calories in addition to the basal requirements. Powerful men working longer hours require even a greater allowance, up to 6,000 calories above the basal requirement. In regard to the quality of the food for heavy work, those items supplied by the ordinary diet are adequate if the vitamin and the mineral content are sufficient. Heavy muscular work does not increase the requirement for protein above the usual 70 to 100 Gm., but it does increase the requirement for fat and carbohydrate. Extra vitamins may be required, since extra carbohydrate may increase the need for vitamin B and sweating the need for vitamin C. The fat content of the diet of some persons cannot be too high because their stomachs will not tolerate it. However, fat, as in fasting, can serve as the chief fuel for work. It has been found that a man working at periods during a twenty-four hour fast may utilize 5,000 calories of reserve energy, of which 0.9 per cent is fat, without suffering serious consequences.

Whether a greater output is secured by continuous or intermittent performance of heavy work depends on the load and the individual. As the load is increased, the more the work output is related to the periods of rest. When a group of men are doing such heavy work as to require rest periods, some evidence indicates that supervised rest periods result in a greater output than if the men are allowed to rest as they please. For example, "two officers at the front, for a friendly wager, competed in making equal lengths of trench, each with an equal squad of men. One let his men work as they pleased, but as hard as possible. The other divided his men into three sets, each working five minutes and resting ten. The latter easily won." The same has been observed for a group of molders in an iron foundry, even though the men at first refused to have their rest periods supervised. Since they were on "piece work" and their income increased, they soon agreed to the new plan.

MODERATE MUSCULAR WORK

Moderate work is arbitrarily defined as that amount which yields a mean metabolic rate of less than three times the basal metabolic rate. There is little or no drain on reserve muscular energy. The increase in oxygen consumption, in heart rate and in blood pressure and the changes in the blood are slight. Most of the labor performed in the modern factory and office is of this sort. The work is of such a nature that relatively slight adjustments in physiologic processes are required. The load lifted and the rate and extent of the muscular contractions in the practiced and physically fit person are such that one ordinarily says that the muscular aspect of the work can be indefinitely prolonged. So it is not surprising that after the day's work is done in the factory the worker frequently begins to spend energy at a fast rate in gardening, ball games or dancing. This is laudable, if not carried to the extent that a night's rest does not permit recuperation.

Regardless of these facts, several hours of continuous moderate muscular or mental work usually produce "fatigue" or an impairment in productivity and a reduction in feeling tone.

IMPAIRMENT OF PRODUCTIVITY

Many things have apparently been found to impair and to improve productivity in factories when the work is moderate. This is true to such an extent that it appears as if almost anything that the management does that attracts the interest of the workers or indicates interest in their welfare improves productivity. This renders it difficult to interpret the results. In many experiments performed to ascertain the effect of a new factor on output only "before and after" output was determined for a relatively short period of time. This is perhaps an adequate type of experiment from a utilitarian point of view, but it is not adequate to determine the specificity of the factor introduced.

Recently it was clearly demonstrated that the output of a group of workers in a shoe factory who ate the ordinary three meals a day was materially increased by providing a forenoon and an afternoon lunch of a glass of milk and a piece of cake. The lunches prevented the usual decrement in production in the latter half of the morning and afternoon. It was concluded that the decrement in output was not due to the work performed but to the operator's need of food. However, one wonders what would have happened to output if the operators had received a bottle of flavored charged water sweetened with saccharin and cellulose cookies flavored with spices and saccharin. Was the improvement in output due to food or was it due to the improvement in the feeling tone that follows ingestion of something appetizing? Or, was it due to the fact that the workers were given something?

The results of the researches conducted in the Western Electric factory in Chicago are of interest in relation to the effect of working conditions on output. The observations were made during a period of five years on 5 women operators experienced in assembling relays. It was found that seasonal environmental changes in temperature and humidity, various types of rest periods, shortening the working day by one-half hour or an hour, the five day work week or a morning lunch, free or brought from home, did not significantly affect the hourly output record. It is to be noted that no extremes in working conditions were tested. The only significant finding was that the output steadily increased during the period of the experiment. As a control, when, with the operators' consent, a return was made to the original conditions of work, with no rest pauses, no special lunches and a full length working week, the daily and weekly output rose to a higher point than ever before. The changes observed could be accounted for only on the basis of psychologic or sociological factors. A study of the effect of intensity of illumination was also made on a large group of operators. It was found that when the light was increased the output increased, because the workers believed that they were expected to produce more, and when the light was decreased the output decreased for the same reason. When a mock change in light bulbs was made, the workers commented favorably on the imagined increase in illumination and produced more.

Those with experience in the field of work know that so-called sociological and psychologic factors cannot be eliminated from any type of work performed by man.

WORK PERFORMED BY SMALL OR SPECIAL MUSCLE GROUPS

Much factory work, such as the assembling of relays and making shoes, as a rule involves standing and the use of special or small groups of muscles. This type of work does not materially increase the total expenditure of energy, but it does increase the intensity of the expenditure of energy by small muscle groups. The burden on the cardiorespiratory system is relatively slight, whereas the burden on the neuromuscular mechanisms of the muscles involved is intense. Even standing is fatiguing. In this connection, it is well known that the adaptation of the circulation of man to standing is still imperfect. The hydrostatic changes embarrass the circulation and the position must be changed, and only the physically fit can stand for long periods of time. However, the expenditure of energy for standing is only about 25 to 50 per cent above the basal metabolic rate. In addition to circulatory embarrassment, the motor nerve endings may undergo fatigue; the sensory nerve endings in muscles, tendons and joints are undoubtedly affected.

Work output and the development of fatigue under conditions of intensive activity of a small group of muscles involve not only the muscles concerned but also the neural units involved in maintaining the activity. It is well known that the block in the fatigue evidenced in maximal voluntary muscular effort is located in the central nervous system and not in the muscles.

So-called fussy work is said to be fatiguing because it consists of several different rhythms and different degrees of effort and precision. This leads to interference. This is also true of mental work. For example, if one must rapidly alternate between addition and subtraction a greater decrease in output will occur than from performing either one alone. Such work requires a rapid "shift of set." However, a purely homogeneous mental task produces a more rapid decrease in output than do varied or heterogeneous tasks, provided the tasks are devoid of the factor of interference. Similarly, homogeneous or monotonous muscular work is said to be "fatiguing" because it is boresome. If such work with practice becomes so semiautomatic as to permit conversation, boredom should disappear under healthy social conditions in the factory or office. Witness the lady with her knitting. Rapidly performed monotonous mental and muscular work is believed to be associated with a decrease in output, because the same neural patterns are used over and over again without sufficient rest to provide recuperation. Mental performance, like neuromuscular performance, is not perfectly continuous. It is interspersed with short pauses or blocks which have recuperative function. These blocks increase in length and frequency in proportion to the length and difficulty of the task even in the presence of incentive. The fatigue phenomena of one mental task influences another mental task only in proportion to the similarity of the tasks. The same is largely true of muscular tasks when small groups of muscles are concerned. The transfer of fatigue effects from mental to muscular work is slight. As is well known, heavy muscular exercise influences mental performance because of the tendency to fall asleep.

It is to be noted that the effects of intense muscular work of a small group of muscles and of intense mental work have been referred to in the same paragraph. This was done because certain fatigue manifestations are common to the two and because fatigue or a decrease in output can occur in the office as well as in the factory. It is now established that intense mental effort can produce fatigue or a decrease in output and in feeling-tone. However, there is no evidence showing that mental effort, in the absence of emotional strain, can produce either neuroses or psychoses.

RECUPERATION

Our knowledge regarding one of the most important aspects of work, namely the time required for and the factors concerned in recuperation, is very meager. It is the most neglected aspect of work, both muscular and mental.

Some evidence indicates that an athlete after ten seconds of maximal exertion may not be fully recuperated in one hour. The trainer believes that after an athletic exertion recuperation is incomplete in twenty-four hours. It is believed that a runner cannot do his best daily, and some believe not even weekly. In hand ergographic tests in which small muscle groups are used and the work is carried to exhaustion, the average recovery in a group of subjects is 90 per cent complete in ten minutes and 95 per cent in twenty minutes. In our own work on the stationary bicycle, in which the subject does continuous heavy work as long as he can maintain the same degree of the work, my associates and I find that recovery in ten minutes amounts to from 45 to 80 per cent, depending on the subject; in one hour the recovery is practically complete. This type of work is rarely performed in industry. No physiologic studies have been made on the rate of recovery from the various degrees of neuromuscular fatigue which occur in different types of work that occur in industry. In the practiced and physically fit person it may be complete after thirteen hours, or there may be a fatigue residue that requires twenty-four hours or longer for recuperation.

Meager data indicate that the recovery from the fatigue effects of mental work resembles that of muscular work. One investigator found that in repetitive mental tasks the optimum rest period was two minutes for each hour of work or five minutes for each two hours. This is much less time than is required for recuperation from muscular work. A rest pause is known to increase feeling tone, but there is no strict relationship between feeling tone and output after a rest pause in either muscular or mental work. However, even in the laboratory, and particularly in the factory, the attitude of the worker toward both the task and the rest pause is very important. This factor is impossible to control perfectly, even in well devised laboratory experiments.

In regard to recuperation from the emotional strain associated with certain types of work, practically nothing is definitely known. The difficulties are the designing of appropriate tests and the individual differences in reaction to the emotional stimulus. Almost every one can talk on the basis of his individual experience.

The problem of recuperation is involved in the question of the effect of hours of work, day and night work, sleep, recreation, type of work, speed of work, Sunday

labor and overtime on feeling tone, output of work, absenteeism, accidents and morbidity. British investigations have provided utilitarian answers to these questions. That is, they have studied the effect of the factors mentioned on productivity. However, the exact physiologic or psychologic mechanisms involved have not been elucidated. In fact, such mechanisms may not be involved; the mechanisms may be entirely economical and sociological when moderate work is performed.

Some authors argue as follows: The average man does not work to his peak capacity; he sets his pace slow, so that a large margin of safety exists. As long as the health, nutrition and hygiene of the worker are good there is no reason why his natural pace should not be increased. There are persons who push themselves to capacity, and when their incentive comes from within health does not appear to be impaired. Given a fanatical desire for physical fitness, power and achievement, efficiency may be greatly increased. The recent accomplishments of Germany and Russia are cited, as well as those of athletes. The motive of the athlete is to excel. So-called chronic fatigue may be due to lack of such a desire. German and Soviet industry has successfully exploited all sorts of psychologic incentives to increase production. The idea that when a tired man is pushed further the fatigue is extreme and out of proportion to the exertion, or the "phenomenon of the last straw," has no evidence in its support.

On the contrary, there is evidence that indicates impairment of sensory thresholds when light monotonous and other types of work are performed for long hours daily. Also, a Sunday's or a day's rest returns the sensory functions to normal. And, further, there may be fatigue residues in the nervous system which are not now detectable by our physiologic and psychologic tests.

Although we cannot explain certain real phenomena, we must recognize their existence from the utilitarian point of view. We cannot adequately explain gravitation, yet we must recognize its existence and act accordingly. We do not know exactly how insulin acts in the body, yet we know that it is necessary for the health of the body. In the same way, we must recognize our individual experience and that of the British Industrial Health Board in regard to the effect of such factors as long hours and overtime on the impairment of productivity.

The British had just as much incentive to fight and to produce in 1914 and after Dunkirk as we have after Pearl Harbor. Yet the British government reported in the first world war and again as late as August 1940 that "the continuation of seven day working, with an average working week of between seventy and eighty hours, will quickly cause a rapid decrease in individual productivity owing to the abnormal strain." Hours have been lowered to forty-eight a week for women and for the majority of men to from fifty-four to sixty hours a week. In Germany, when the war started, the government by a series of decrees, removed the safeguards against overwork. On Jan. 1, 1940 the German government published a new decree, stating that the principle of the eight hour day would be observed and that nowhere could the working hours be extended beyond twelve hours. The decree stated that women and young persons could not work on night shifts and that the granting of holidays should be returned. The reversal of policy was due to increased illness, absenteeism and accidents.

Whether the decrease in output with long hours is due to the accumulation of residual organic fatigue in the neuromuscular mechanisms, to a decline in excitatory value of the incentive or to the effects of the emotional strain associated with work of various sorts is unknown. In fact, this phenomenon of the effect of overtime may be similar to staleness in muscular work. Every one who has worked with the athlete or with the experimental subject doing maximal or submaximal work is acquainted with the phenomenon of staleness. As I have observed staleness, it is a complex phenomenon and cannot be attributed solely to a decline in incentive and feeling tone. The mechanisms involved, however, are uncertain. In mental work, from personal experience, staleness also occurs. In learning, a plateau is reached as in the output of muscular work, but the experiments on learning have not been extended sufficiently to bring out the phenomenon of staleness. Habits formed in the learning process or in learning to do work may alter the height of the plateau. In the output in factory work the same phenomenon is seen, and it is known as "stereotyped output." An old factory munitions crew will produce at a certain plateau. A new factory munitions crew, starting in a new environment, may reach a plateau twice as high as that attained by the old crew. And it appears that the plateau of the old crew cannot be materially elevated regardless of what is done. It appears that the crew has formed working habits that cannot be materially changed.

Some of the more important observations made by the British during the first world war and in this war may be summarized as follows: [1]

1. An extension of the usual hours, except for a short period, does not yield a proportional increase in output.

2. After an extended period of overtime has been discontinued, weeks are required before the original steady output is attained.

3. More than sixty hours a week leads to increased lost time during work, increased absenteeism and sickness. One day's rest in seven is essential. British experience has shown fifty-six hours a week to be the optimum standard for men.

4. Organized or enforced rest periods, particularly with an opportunity to take food during the period, assist in the maintenance of a high output level.

It is of interest that the original investigations of the British health board were undertaken because of the increase in illness among munitions workers in the

1. These observations include:
Hours of Work and Maximum Output, Great Britain Ministry of Labor, London, August 1940.
Vernon, H. M.: Hours of Work in War Time, Industrial Welfare, December 1939; Sickness and Accidents Among Munitions Workers, ibid., February 1940.
Osborne, Ethel E.: The Output of Women Workers in Relation to Hours of Work in Shell Making, London, Industrial Fatigue Board, Bulletin 2, 1919.
Kent, A. F. S.: Industrial Fatigue, Sessional Papers, House of Lords **53,** Cd. 8056, 1914-1916; **16,** Cd. 8335, 1916.
Bridges, J. C.: Worker's Health in Wartime, Industrial Welfare, January 1940.
Industrial Health Research Board, 18th annual report, London, 1938; Industrial Health in War Emergency, report 1, 1940.
Bevin, William: Ministry of Labor Gazette, London, October 1940, p. 26.
Industrial Health and Efficiency, Bulletin 249, United States Department of Labor, Bureau of Labor Statistics, 1919.
Rees, J. R.: Psychological Problems of Industry at War, Industrial Welfare, June 1940.
National Expenditure, editorial, Engineer **171:** 62, 1941. Holidays,

last war. The same observations have been made under conditions of overtime in the present war. For example, among women the loss of time due to illness during a sixty-two hour week was twice that of a forty-four hour week. For men the same was true for a sixty-four hour week versus a fifty-four hour week. The overtime workers have usually complained of headaches, pains in the back, legs and feet, indigestion, palpitation and insomnia, and the consumption of alcoholic liquors among them has been observed to have increased considerably. The relation of overtime to accidents is not so decisively demonstrated. However, in one survey of 50,000 accidents occurring in four factories, the twelve hour day was associated with three times more accidents than during a ten hour day among women. A similar proportional excess was not observed for men, however.

No studies have been made to my knowledge of the effect of short vacations on productivity. An editorial in the *Engineer*[2] points out that even in the days of serfdom the overlords recognized that monotony is "soul destroying and the breeder of trouble" and that a period of relaxation is something that the laborer can look forward to with pleasurable anticipation. A short vacation may possibly be the solution to the problem of staleness.

SUMMARY

It may be said that work as performed by the average person cannot be reduced to a simple formula. The fatigue of the ordinary factory worker is too subtle to yield to the ordinary tests of the physiologist. The tests of the psychologists do not provide the answer. Neither has gotten to the basis of the mechanisms involved in so-called chronic industrial fatigue or of the decrease in productivity and increase in illness associated with long hours of light or moderate work. Social and economic conditions inside and outside the factory and office are very important. The psychologist and director of personnel has much to contribute. The physiologist and physician can contribute by giving advice regarding recreational programs, by dealing with the hazards of industry and by devoting attention to the health and nutrition of the worker. The physician since the time of Hippocrates has known the importance of rest and diet in the treatment of disease. He knows the value of rest, diet and recreation in the prevention of disease. We cannot win the war with work alone. Work demands rest, good food and wholesome recreation, which implies physical and mental fitness. The spirit of willingness and patriotism is essential, but it is not enough. Physical fitness is requisite for sustained effort and output.

303 East Chicago Avenue.

2. Holidays, editorial, Engineer **172**: 104, 1941.

Novel Device for Collecting Air Samples in Inaccessible Places.—An apparatus has been designed for collecting remote air samples for chemical analysis in mine shafts and the like which cannot be entered (W. J. Fene, I. C. 7122, U. S. Bureau of Mines, Washington, D. C., 1940). An evacuated glass bulb is mounted together with a snap-type mousetrap on a board in such a way that, when the supporting cord is quickly jerked, the trap is sprung. This breaks off the short sealing tip on the bulb and thus allows the air sample to enter the bulb. Full details for the construction of the apparatus are given.

THE EFFECTS OF EXPOSURE TO TOLUENE IN INDUSTRY

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In the winter of 1940-1941 a survey of the airplane industry in New York State was made by the Division of Industrial Hygiene of the New York State Department of Labor. In the course of this survey it was found that large amounts of toluene were being used as a component of paints. Preliminary analyses of the air of the workrooms in which these paints were being used showed relatively high concentrations of toluene.

Use of toluene in this country has increased in the past few years. Whereas in 1930 there were 16,097,856 gallons produced, in 1939 the amount of toluene produced exceeded 24,000,000 gallons.[1] Toluene has gradually replaced benzene (benzol) in many industrial processes. In recent months, however, use of toluene has expanded enormously owing to the requirements of the defense program. The importance of this substance in national defense industries prompted the immediate reappraisal of its toxicity.

SCOPE OF STUDY

This study is intended to present data on the toxicity of toluene. It deals with the results of physical examinations of 106 painters in a large airplane factory in New York State.[2] These painters were exposed to toluene-containing paints. The study includes a careful evaluation of the working environment. The severity of the exposure of the workers examined was based on 92 samples of air.[3] Thus an estimate of the physical conditions in terms of the severity of exposure was possible, and the results obtained constitute the contribution of this paper to the literature on toluene intoxication.

OCCUPATIONAL GROUPS EXAMINED

In order to evaluate the conditions found in the group exposed to toluene, a separate group of 430 fur workers (355 men and 75 women) not exposed to this substance was also examined. This constitutes the control group. Table 1 shows that the age distribution of the toluene-exposed workers corresponds closely to that of the group constituting the controls.

The toluene-exposed workers were representative of three distinct occupational subgroups, namely spray painters (51 men), dip painters (25 men) and brush painters (30 men). Two paint mixers are included with the brush painters since their exposure corresponded to

From the Division of Industrial Hygiene, New York State Department of Labor.
Read before the Industrial Hygiene Section of the American Public Health Association, Atlantic City, N. J., Oct. 16, 1941.

1. Reports of the United States Tariff Commission on synthetic organic chemicals, 1930 and 1939.

2. The cooperation given the authors by Dr. A. H. Garvin made this study possible.

3. All samples of air were obtained and analyzed in accordance with the technic developed by the United States Bureau of Mines (Yant, W. P.; Pearce, S. J., and Schrenk, H. H.: A Microcolorimetric Method for the Determination of Toluene, U. S. Bureau of Mines, Report of Investigation No. 3323, 1936) as modified (Burke, W. J.; Moskowitz, Samuel; Siegel, J.; Dolin, B. H., and Ford, C. B.: Industrial Air Analysis—A Description of Some of the Chemical Methods Employed in the Laboratory, Division of Industrial Hygiene, New York State Department of Labor, 1941) by the laboratory of the Division of Industrial Hygiene of the New York State Department of Labor.

that found for this occupational group. One spray booth maintenance man was included with the sprayers for similar reasons.

Spray painting was carried on in mechanically ventilated booths. In a few instances the painters were required to work on the main assembly floor where no mechanical ventilation was provided. At these times they were provided with filter-type respirators. When spraying was necessary inside the fuselage of the airplanes, airline respirators were supplied to the men although they were not always used.

TABLE 1.—*Age Distribution of Toluene-Exposed Workers and Controls*

Age in Years	Control		Present Study Group	
	Number	Per Cent	Number	Per Cent
-19	12	2.8	5	4.7
20-29	113	26.3	42	39.6
30-39	125	29.1	26	24.5
40-49	98	22.8	21	19.8
50-59	71	16.5	11	10.4
60-69	11	2.5	1	1.0
Total	430	100.0	106	100.0

All employees examined in the factory studied worked an average of eight hours each day of a forty hour week. There were three shifts in the paint shops, but only those men whose exposure was for less than two weeks or for whom the exposure was found to be negligible, on the basis of analyses of the air, were omitted from this study. The latter comprise so-called touch-up men whose duties were to cover up blemishes and scratches of the partially completed or completed airplane assembly.

Samples of air were taken at the breathing level of the worker as his usual duties were performed, and on the basis of the analyses the average exposure to toluene was calculated on an eight hour basis, the result being a weighted concentration of exposure. The number of workers and their average exposure is presented in table 2, from which it will be observed that the average exposures ranged from 100 to 1,100 parts per million.

Of the 106 workers studied, the brush painters (30 men) had been exposed to benzene prior to four months before the beginning of the present study. A second group composed of 15 workers had been exposed to the inhalation of volatile solvents of unknown nature less than two years prior to the beginning of the present study. Deduction of these two groups leaves a group of 61 workers who were exposed to inhalation of toluene for a period of from two weeks to more than five years and who, so far as is known, had not been exposed to the inhalation of other toxic volatile solvents. This last group is hereinafter referred to as the uncomplicated exposure group.

Some few laboratory procedures were performed in the present study for which the fur workers did not provide a control. In those instances a control, if available, from another industrial group was utilized. When this has been done, mention will be made of the fact. However, hereafter when the term "control" is used it will denote the fur workers, unless mention is made of another source.

MATERIALS USED

The composition of the paints [4] used are shown in table 3. It will be noted that the paints contained a high percentage of toluene and certain other organic solvents. The preponderance of toluene in these paints, however, far exceeds the percentages of other volatile portions.

4. The term "paint" is used in this presentation to include paints, lacquers, enamels and the like.

ENVIRONMENTAL CONDITIONS

All painting operations were performed in three areas: the large paint shop, the dip room and the spray booth located on the airplane assembly floor. The large paint shop was 217 by 100 feet and had a 25 foot ceiling. The spray booths in this room were of two types: one for small parts and the other for airplane fuselages and wings. The booths for small parts were constructed by partitioning off a bench-type booth 60 feet long into six parts. Each of these was 6½ feet high. The air velocity at the face of these booths was 90 feet per minute. The large booths, of which there were four, measured 12 feet by 12 feet and were about 40 feet deep. The average air velocity at the face of these booths was 90 feet per minute. The ventilation of all the spray booths was by means of propeller-type fans mounted in exhaust ducts above the booths.

The large paint room also housed the brush painters in one section of the room, about 20 feet from the nearest booth. The ventilation here was that provided by the exhaust of the spray booths.

The paint dip room was 86 feet by 22 feet with a 25 foot ceiling. There were three open paint troughs in this room the tops of which were 30 inches from the floor. These troughs were 18 feet long, 14 inches across and 12 inches deep. Two were located along opposite walls at the far end of the room. On the wall above each of these were stationary drying racks. The third trough was in the front part of the room. In back of this trough was a conveyor type drying rack.

An ineffective system of local exhaust was present on the troughs in the form of 1 inch wooden slots along the edges. These were connected to exhaust manifolds. The slots were all stopped up with dried paint. The ventilation in the paint dip room can, therefore, be considered as general ventilation. Air measurements made at all sources of air movement in and out of the room showed a total ventilation of 15,000 cubic feet of air per minute.

TABLE 2.—*Calculated Average Exposures to Toluene of All Workers Examined*

Toluene, Parts per Million	Workers in Present Study	
	Number	Per Cent
100	30	28.3
150	5	4.7
200	21	19.9
250	2	1.9
300	8	7.6
350	2	1.9
400	11	10.4
500	10	9.4
600	4	3.8
700	5	4.7
800	5	4.7
900	1	0.9
1,000	1	0.9
1,100	1	0.9
Total	106	100.0

The spray booth on the assembly floor was 12 feet by 8 feet and 15 feet deep. It was ventilated by the same type of fan as the booths in the large paint room. This booth had a crew of 3 men whose particular duty it was, in addition to spraying materials in the booth, to spray materials directly on the assembly floor without any mechanical ventilation.

PHYSICAL EXAMINATIONS

The tabulation shows the form used for the history and physical examination. The data required by this form are of necessity brief in order to make the time of examination as short as possible and still give the desired information as to the toxicity of toluene.

Name Sex M F Age

Occupational History:
Present: Duration Yrs. Mos. Wks. Wear respirator Yes No
Type
Full time
Hours per week Part time

Previous: 1.
2.
3.

Medical History:
Constipation Cramps Headache
Dyspnea on exertion Dizziness
Cough Irritability
Sore throat (frequent) Wt. Now 1 Yr. ago
Weakness
Easy fatigability
Appetite
Nausea
Hemorrhage Spontaneous Traumatic Skin
Nose Petechiae
Mouth, Gums Ecchymoses
Rectum

Physical Examination:
Blood pressure Pulse rate
Abdomen Liver enlarged Spleen enlarged
Skin pallor Cyanosis Flush Petechiae Ecchymoses
Gums Bleeding Lead line
Lymph glands (enlarged) Axillary Inguinal Cervical
Bony tenderness Tibia Sternum
Weakness Hands

Form used for history and physical data of workers.

Extensive laboratory studies of the blood of exposed workers were made. This was done in view of the important blood changes reported in the literature with regard to the toxic effects of the aromatic hydrocarbons. The detailed studies made, their number and the method used are indicated in table 4.

Routine urine analyses were made on a large group of workers. The specific gravity determination of the urine was done by the usual method. Benedict's qualitative solution was used to test for sugar. The "heat and acetic acid" test was done for determination of albumin. Examinations for formed elements were done on sediments obtained by centrifugation.

In addition to these examinations an examination of the eyes was done on 26 selected men of the day shift. These men were chosen as having the greatest exposure to toluene. The examinations were done in a properly equipped dark room by a competent ophthalmologist.[5] His examination in each case consisted of a history of ocular complaints, visual acuity, fundus, pupil and slit lamp investigation of the media of the eye. The results of these examinations, however, were negative and are not referred to elsewhere in this report.

RESULTS OF STUDY

Symptoms.—All the men examined were symptom free so far as the history form covers this subject.[6]

Physical Manifestations.—There were two outstanding conditions found by our physical examinations. These were the presence of perforated nasal septums in 5 workers and a high incidence of enlargement of the liver, the latter finding being observed in 32 men.

It is likely that the perforations of the nasal septum were associated with the large amounts of zinc chromate present in most of the paint being used. Incidentally, the blood Wassermann reactions of the men having perforated nasal septums were negative.

Enlargement of the Liver: Of the 106 men examined, it was found that 32 men, or 30.2 per cent, had enlargement of the liver as observed by palpation. The control group of 355 men had an incidence of this condition of 7 per cent. The enlargement varied from 1 to 5 finger-breadths below the costal margin. The liver edges were all smooth, and in no case was the liver tender. Considering the previously defined uncomplicated exposure group, it was noted that of the 61 men there were 13, or 21.4 per cent, with enlarged livers. This is three times the frequency of the control group.

TABLE 3.—*Analysis of Paint Used by Painters* *

	Percentage in Mixture
Spray painters	
Primer (75% of paint used):	
Zinc chromate	10.8
Magnesium silicate	0.7
Synthetic resin	12.8
Driers (lead and cobalt compounds)	0.3
Xylene	5.8
Toluene	69.6
	100.0
Lacquer 1 (15% of paint used):	
Volatile portion:	
Ethyl alcohol	7.0
Ethyl acetate	18.0
Butyl alcohol	7.0
Butyl acetate	15.0
Petroleum naphtha	3.0
Toluene	50.0
	100.0
Nonvolatile: Nitrocellulose, synthetic resin, titanium oxide, ferrocyanide blue, iron oxide, carbon black, zinc oxide, etc. No lead compounds	
Lacquer 2 (10% of paint used):	
Volatile portion:	
Toluene	25.0
Xylene	33.0
Petroleum naphtha	42.0
	100.0
Nonvolatile: Resin, titanium oxide, zinc oxide, ultramarine blue, ferrocyanide blue, iron oxide, diatomaceous earth, amorphous silica, carbon black	
Brush painters	
Dope:	
Volatile portion:	
Ethyl acetate	16.5
Ethyl alcohol	3.2
Butyl acetate	16.5
Butyl alcohol	5.6
Petroleum naphtha	13.7
Toluene	44.5
	100.0
Nonvolatile: Nitrocellulose, glycol sebacate, aluminum, cadmium sulfide, barium sulfate	
Brush wash:	
Acetone	22.5
Ethyl alcohol	22.5
Toluene	55.0
	100.0

* Dip painters used a primer only of the same composition as given for spray painters.

Laboratory Findings.—Erythrocyte Counts: In table 5 the frequency distribution of the erythrocyte counts is shown. Employing 4.5 million erythrocytes per cubic

5. The ophthalmologic examinations were done by Dr. H. C. Goldberg of the Division of Workmen's Compensation of the New York State Department of Labor.

6. There were a few men among the dippers who complained of dermatitis. This is not given any further space in this report. Suffice it to say that hand dipping into a paint of high toluene content often produces dermatitis.

millimeter as a critical level, one finds that, whereas the control group had a percentage of 5.2 below this level, the toluene-exposed group showed this condition in 17 per cent of the men. Of the uncomplicated exposure group 8 men, or 13.1 per cent, had erythrocyte counts below this level.

TABLE 4.—*Number and Type of Blood Examinations Performed on Toluene-Exposed Workers*

	Workers on Whom Examinations Were Performed	Method
Erythrocyte count	106	Standard
Leukocyte count	106	Standard
Hemoglobin	106	Newcomer (Todd and Sanford: Clinical Diagnosis by Laboratory Methods, Philadelphia, W. B. Saunders Company, 1937)
Differential leukocyte count	103	Wright's stain; 200 cells counted
Reticulated erythrocytes	81	Cresyl blue counterstained with Wright's stain
Basophilic aggregation	73	McCord (McCord, Minster and Rehm: The Basophilic Aggregation Test in Lead Poisoning, J. A. M. A. **82**: 1759, 1924) modified by Vela Gonzales (Basophilic Aggregation Test, Ohio Dept. of Health, Columbus, 1940)
Coagulation time	92	Capillary tube
Erythrocyte sedimentation rate	106	Wintrobe (Wintrobe and Landsberg: A Standardized Technic for the Blood Sedimentation Test, Am. J. M. Sc. **189**: 102, 1935)
Hematocrit	106	Wintrobe (The Direct Calculation of the Volume and Hemoglobin Content of the Erythrocyte, Am. J. Clin. Path. **1**: 147, 1931)
Mean corpuscular volume	106	Wintrobe
Mean corpuscular hemoglobin	106	Wintrobe
Mean corpuscular hemoglobin concentration	106	Wintrobe
Wassermann test	104	Standard
Serum bilirubin	91	Ernst and Forster (Ueber die Bestimmung des Blutbilirubins, Klin. Wchnschr. **3**: 2386, 1924)
Erythrocyte fragility	83	Todd and Sanford (Clinical Diagnosis by Laboratory Methods, Philadelphia, W. B. Saunders Company, 1937)
Platelet count	92	Indirect

Hemoglobin: Table 6 shows the distribution of the hemoglobin levels. For the purpose of comparison there is presented in this table a series of eighty-one control hemoglobin measurements and also a series of hemoglobin measurements on 69 silicotic workers. The present data are presented in two groups, 106 workers in the group as a whole and the uncomplicated exposure group composed of 61 men. It should be pointed out here that all the hemoglobin determinations were made by the Newcomer method with the exception of the control group of 81 workers on whom the hemoglobin determinations were made by a photoelectric technic. The data on the silicotic workers are presented at this time to serve as an additional control; moreover because of the fact that the hemoglobin values of the silicotic workers were determined in the same manner as the toluene-exposed group.

In table 6 it is observed that whereas in the control group only 2.4 per cent have hemoglobin values of 16 Gm. or more per hundred cubic centimeters of blood, in the present study group 37.7 per cent had this level. Further, when one compares the hemoglobin values obtained in the present study with that obtained in a group of 75 men in various stages of silicosis in whom high values were anticipated, one finds a parallel incidence of values of 16 Gm. or more of hemoglobin. There were 37.9 per cent of the silicotic workers who had these high values. In the uncomplicated exposure group 18 men, or 29.5 per cent, had elevated values of hemoglobin.

Absolute Lymphocyte Count: Although the differential leukocyte counts of the toluene-exposed group showed no significant divergence from that of the control, the absolute lymphocyte count was abnormal. Table 7 shows the frequency distribution of the absolute lymphocyte counts. Considering the high figure of 5,000 lymphocytes per cubic millimeter as the critical level, it is observed that, whereas the control group has an incidence of 7.7 per cent having absolute lymphocyte counts above this level, the toluene-exposed group had this finding in 19.5 per cent of cases. Further, the uncomplicated exposure group [7] had this finding in 20.4 per cent of the cases.

Mean Corpuscular Volume: The frequency distribution of the mean corpuscular volume values is shown in table 8. When the high value of 100 cubic microns is taken as the critical level, it is observed that whereas in the control group 7.2 per cent had mean corpuscular volume values of this level or higher, in the exposed group 23.6 per cent had such values and in the uncomplicated exposure group 21.3 per cent had such elevated levels.

TABLE 5.—*Distribution of Erythrocyte Count in Toluene-Exposed Workers and Controls*

Erythrocyte Counts in Millions	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
3.00-3.49	0	0.0	1	0.9	0	0.0
3.50-3.99	3	0.9	2	1.9	0	0.0
4.00-4.49	15	4.3	15	14.1	8	13.1
4.50-4.99	112	32.4	38	35.9	24	39.4
5.00-5.49	141	40.8	36	34.0	21	34.4
5.50-5.99	49	14.2	12	11.3	8	13.1
6.00-6.49	21	6.0	2	1.9	0	0.0
6.50-6.99	5	1.4	0	0.0	0	0.0
Total	346	100.0	106	100.0	61	100.0

TABLE 6.—*Distribution of Hemoglobin (Newcomer) in Toluene-Exposed Workers Contrasted with Findings in the Control Group and a Silicotic Group*

Hemoglobin, Gm. per 100 Cc.	Control		Present Study		Uncomplicated Exposure Group		Silicotic Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
12.0-12.9	2	2.4	4	3.8	2	3.3	0	0.0
13.0-13.9	25	30.9	8	7.4	5	8.2	7	10.1
14.0-14.9	40	49.5	21	19.7	10	16.4	22	31.9
15.0-15.9	12	14.8	33	31.1	26	42.6	14	20.3
16.0-16.9	2	2.4	28	26.8	13	21.3	15	21.8
17.0-17.9	0	0.0	8	7.4	5	8.2	9	13.0
18.0-18.9	0	0.0	4	3.8	0	0.0	2	2.9
Total	81	100.0	106	100.0	61	100.0	69	100.0

7. Differential leukocyte counts were performed on 59 out of the 61 in the uncomplicated exposure group.

Mean Corpuscular Hemoglobin: The frequency distribution of the values of the mean corpuscular hemoglobin is shown in table 9. The control in this instance was the same as that used for the hemoglobin values and carries the same limitations, since the mean corpuscular hemoglobin is derived from the hemoglobin value.[8] It will be observed that whereas none of the control group had values of 35 micromicrograms for the mean corpuscular hemoglobin, 17.9 per cent of the present study group had such a value. The uncomplicated exposure group had such high values in 13.1 per cent of the cases.

Mean Corpuscular Hemoglobin Concentration: The frequency distribution of the mean corpuscular hemoglobin concentration is shown in table 10. The control in this instance was the same as that used for the hemoglobin values and carries the same limitations since the mean corpuscular hemoglobin concentration is derived from the hemoglobin value.[9] It is observed that, whereas the control group had 2.5 per cent of cases with concentrations above 34 per cent, in the toluene-exposed group this concentration was observed in 39.7 per cent of the cases. The uncomplicated exposure group showed this concentration in 34.4 per cent of the men.

Other Hematologic Data: The remainder of the hematologic data was within normal limits. This included leukocyte counts, differential leukocyte counts, reticulated erythrocytes, basophilic aggregation estimation, platelet count, erythrocyte sedimentation rate, coagulation time, hematocrit values, erythrocyte fragility and serum bilirubin. Of the 104 Wassermann tests performed only 2 gave positive results. The results of all these blood tests were striking, as some abnormalities were expected, particularly since some of the abnormalities have been regarded as indicative of intoxication. It is necessary to stress that the results relative to the tests mentioned were carefully made and checked with control data. In many instances two or more determinations were made.

Urinary Findings: No abnormality was noted in the specific gravity determinations. Of the 91 specimens of urine analyzed for albumin, 4, or 4.4 per cent, gave a positive result. Of the control group 5.4 per cent gave such a result. Only 1 of the 94 specimens examined for "sugar" was found positive. The control group showed glycosuria in 5.2 per cent of cases. In all cases the urinary sediment was essentially normal.

TABLE 7.—*Absolute Lymphocyte Count in Toluene-Exposed Workers Contrasted with the Control Group*

Lymphocytes per Cu. Mm.	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
1,000-1,999	34	8.6	5	4.8	4	6.8
2,000-2,999	120	30.4	23	22.3	17	28.8
3,000-3,999	145	36.8	31	30.1	13	22.0
4,000-4,999	65	16.5	24	23.3	13	22.0
5,000-5,999	17	4.3	15	14.6	9	15.3
6,000-6,999	9	2.3	3	2.9	2	3.4
7,000-7,999	2	0.5	1	1.0	0	0.0
8,000-8,999	1	0.2	1	1.0	1	1.7
9,000-9,999	0	0.0	0	0.0	0	0.0
10,000-10,999	1	0.2	0	0.0	0	0.0
11,000-11,999	1	0.2	0	0.0	0	0.0
Total	395	100.0	103	100.0	59	100.0

TABLE 8.—*Mean Corpuscular Volume in Toluene-Exposed Workers Contrasted with Findings in the Control Group*

Mean Corpuscular Volume in Cubic Microns	Contral		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
70 - 74	1	0.9	0	0.0	0	0.0
75 - 79	9	8.1	6	5.7	2	3.3
80 - 84	13	11.7	15	14.1	8	13.1
85 - 89	30	27.1	12	11.3	8	13.1
90 - 94	25	22.5	29	27.4	19	31.2
95 - 99	25	22.5	19	17.9	11	18.0
100 -104	7	6.3	13	12.3	6	9.8
105 -109	0	0.0	8	7.5	6	9.8
110 -114	1	0.9	4	3.8	1	1.7
115 -119	0	0.0	0	0.0	0	0.0
Total	111	100.0	106	100.0	61	100.0

TABLE 9.—*Mean Corpuscular Hemoglobin in Toluene-Exposed Workers Contrasted with the Control Group*

Mean Corpuscular Hemoglobin in Micro-micrograms	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
24 - 29	64	87.7	25	23.6	16	26.2
30 - 34	9	12.3	62	58.5	37	60.7
35 - 39	0	0.0	17	16.0	8	13.1
40 and over	0	0.0	2	1.9	0	0.0
Total	73	100.0	106	100.0	61	100.0

TABLE 10.—*Mean Corpuscular Hemoglobin Concentration in Toluene-Exposed Workers Contrasted with the Control Group*

Mean Corpuscular Hemoglobin Concentration, per Cent	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
25 - 29	6	7.4	5	4.7	5	8.2
30 - 34	73	90.1	59	55.6	35	57.4
35 - 39	2	2.5	41	38.7	21	34.4
40 and over	0	0.0	1	1.0	0	0.0
Total	81	100.0	106	100.0	61	100.0

COMMENT

It appears from these data that the results of chronic exposure to toluene of the varying intensities noted produced some objective abnormalities but practically no symptoms. The absence of severe illness was a surprising revelation in view of the fact that the concentration of toluene in the inspired air reached the relatively high average level of 1,100 parts per million and that the period of exposure exceeded five years in many instances. In no instance was it felt necessary to remove an exposed worker from his occupation because of the inhalation of toluene.

More specifically, there were observed certain abnormalities which, in the light of previous experience, must be interpreted as evidence of mild intoxication. These abnormalities were enlarged liver, mild depression of the erythrocyte level, elevation of mean cell volume, absolute lymphocytosis, elevation of the hemoglobin value,

8. Mean corpuscular hemoglobin $= \frac{\text{Grams hemoglobin/1,000 cc. of blood}}{\text{red blood cells in millions per cu. mm.}}$

9. Mean corpuscular hemoglobin concentration $= \frac{\text{grams hemoglobin in 100 cc.} \times 100}{\text{volume of packed red blood cells in 100 cc. of blood}}$

elevation of the mean corpuscular hemoglobin and elevation of the mean corpuscular hemoglobin concentration.

The finding of hepatomegaly is of especial importance, since such a finding as a result of exposure to toluene appears not to have been heretofore described.

TABLE 11.—*Relation of Length of Exposure and Intensity of Exposure to Abnormality of Erythrocyte Count (Below 4.50 Million) and Mean Corpuscular Volume (Above 99 Cubic Microns) Among Toluene-Exposed Workers*

Toluene, Parts per Million	To One Year			One to Five Years			Five Years and Over		
		Abnormal			Abnormal			Abnormal	
	Cases	Number	Per Cent	Cases	Number	Per Cent	Cases	Number	Per Cent
100 - 150	3	0	0.0	2	0	0.0	2	1	50.0
200 - 400	12	2	16.6	13	3	23.0	6	2	33.3
500 -1,100	15	4	26.7	5	2	40.0	3	0	0.0

Since no correlation was found between enlargement of the liver and either clinical or laboratory evidence of disease, the possibility suggested itself that the enlargement of the liver might be compensatory in character rather than an indication of hepatic disease. The data collected in the present study, however, are considered insufficient to provide an answer to this question.

The decrease of the erythrocyte levels was of only a moderate degree. This is in strong contrast with observed effects of inhalation of benzene.[10]

TABLE 12.—*Abnormalities Observed Among the Sixty-One Workers in the Uncomplicated Exposure Group*

Case	Liver Enlargement in "Fingers" Below Costal Margin	Erythrocyte Count Below 4.50 Million	Mean Corpuscular Volume Above 99 Cubic Microns	Lymphocytosis
2	1	....	...	.....
7	0	4.26	106	.....
26	0	....	...	5,525
27	0	....	103	5,733
28	0	4.35	110	.....
30	0	4.32	106	5,980
31	0	....	...	5,250
42	0	....	...	6,392
51	4	....	...	.....
53	4	....	...	.....
54	0	4.43	106	.....
57	0	....	...	5,014
58	1	....	103	5,617
62	0	....	108	.....
73	4	....	100	.....
83	4	4.47	103	.....
99	4	....	...	5,085
101	2	....	...	.....
102	0	....	102	.....
104	4	....	...	.....
107	0	4.24	106	.....
113	2	.....	...	.....
116	0	4.38	...	.....
119	3	....	...	.....
121	3	....	...	.....
123	4	....	105	8,290
126	0	....	...	5,868
128	0	....	...	6,420
129	0	4.26	101	.....

The increase in absolute lymphocyte counts has frequently been described in exposures to various toxic substances in industry and requires no further comment at this time. The same may be said about the elevation of mean corpuscular volume.[11]

In an attempt to develop a correlation between length of exposure or intensity of exposure and the incidence of abnormal conditions there resulted the development of such small statistical categories that conclusions appeared to be unwarranted. However, in table 11 are presented the instances of abnormal mean corpuscular volume and decreased erythrocyte counts correlated with length of time of exposure and intensity of exposure considered together. Although some correlation was noted, a completely satisfactory correlation has not been found.

DIAGNOSIS OF CHRONIC TOLUENE INTOXICATION

Of the 61 persons in the uncomplicated exposure group there were 29 men, or 47.5 per cent, who had one or more abnormalities related to exposure to toluene. Table 12 lists these conditions. These persons are all believed to have evidence of early intoxication.

Of the results recorded in table 12 it will be noted that 22 of the 29 men possessed either elevated mean corpuscular volume, enlarged livers or both. Based on this evidence, it is our belief that when there is industrial exposure to toluene, search of these two indexes at an early date will most likely reveal the presence or absence of the toxic effects of this substance.

TABLE 13.—*Total Leukocyte Counts*

Leukocyte Counts in Thousands	Control		Present Study	
	Number	Per Cent	Number	Per Cent
Less than 4.49	3	0.6	2	1.9
4.50 - 4.99	7	1.7	0	0.0
5.00 - 5.49	8	2.0	0	0.0
5.50 - 5.99	21	5.2	6	5.7
6.00 - 6.49	27	6.7	5	4.7
6.50 - 6.99	42	10.4	7	6.6
7.00 - 7.99	54	13.5	16	15.0
8.00 - 8.99	71	17.7	16	15.0
9.00 - 9.99	52	12.9	15	14.2
10.00 - 10.99	56	13.9	13	12.3
11.00 - 11.99	24	6.0	12	11.4
12.00 - 12.99	17	4.2	7	6.6
13.00 - 13.99	9	2.2	3	2.8
14.00 and over	12	3.0	4	3.8
Total	403	100.0	106	100.0

Stress should be placed on the fact that leukopenia was not observed. There were 2 instances of depressed leukocyte counts found in the study (table 13). However, the fact that such cases in approximately equal numbers were found in the control group leads to the conclusion that the conditions of the experiment did not result in leukopenia.

CONCLUSIONS

Based on this study of 106 painters exposed to the inhalation of toluene of between 100 and 1,100 parts per million for periods of time ranging from two weeks to more than five years, it is concluded that:

1. Industrial exposure of human beings to toluene resulted in enlargement of the liver, macrocytosis, moderately decreased levels of erythrocyte counts and absolute lymphocytosis.
2. Such exposure did not result in leukopenia.
3. Early chronic toluene intoxication in man is best evidenced by hepatomegaly and macrocytosis.

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THE TOXICITY AND POTENTIAL DANGERS OF TOLUENE

PRELIMINARY REPORT

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Toluene is used extensively as a solvent in the lacquer industry, and in the explosives industry it plays an important role as a starting material for trinitrotoluene. At present it is generally assumed that the maximal permissible concentration of toluene is about 200 parts per million parts of air. It appears, however, that there is little evidence to sustain the validity of this concentration as the maximal permissible limit. For this reason the following study was undertaken with the hope of establishing more definite data on which maximal permissible concentrations could be based.

Cole and Armstrong [1] established, by spectrophotometric determination, that the toluene used for this investigation was of a high degree of purity, containing not more than 0.01 per cent of benzene.

Animal experiments indicate that toluene is more irritant and, with lower concentrations, has a somewhat stronger narcotic action than benzene but that its effect on the blood picture and the blood-forming organs is considerably less severe and of a different type. Regarding its toxicity for man, an exact appraisal of its hazards is difficult, because only exceptionally is there an exclusive exposure to toluene, since in most industries it is frequently mixed with xylene and benzene, as previously described by one of us.[2]

In order to establish a maximal permissible concentration it was deemed most convenient to study first the acute effect of various concentrations on man and then follow these studies with continued exposure experiments on animals, concentrations being used which could be tolerated by man with eight hours' exposure or which gave evidence of some toxic effects.

THE EFFECTS ON HUMAN BEINGS OF EXPOSURE TO VARIOUS CONCENTRATIONS OF TOLUENE

These experiments were carried out in a two compartment exposure chamber with a total capacity of 29,220 liters, the connecting door between the two compartments being wide open throughout the entire experiment so that the concentration of toluene in the two rooms was the same. Experiments showed that by evaporating toluene at a certain rate and mixing the vapors with the air circulating through these chambers the desired concentration could be established and maintained, while at the same time adequate ventilation and fairly constant room temperature and humidity could be provided. The concentration was controlled throughout the experiment by interferometric determinations, and the addition of toluene was increased or decreased as required, as described by Armstrong.[3] In this way it was possible to maintain concentrations of 50, 100, 200, 300, 400, 600 and 800 parts of toluene per million parts of air, with only minor fluctuations, by adding 0.8, 1.61, 3.22, 4.83, 6.44, 9.66 and 12.88 cc. of toluene a minute to an air current of 3,681 liters (130 cubic feet) a minute entering the chamber. The median temperature within the exposure chamber was 79 F., with 74 and 88 F. as extremes, and the relative humidity was 28 per cent in the median, with 20 and 40 per cent as extremes.

Three normal persons of different ages (between 35 and 53 years) and with different physical characteristics volunteered for these experiments. Before entering the chamber they underwent a medical inspection and their systolic and diastolic blood pressure, pulse rate, respiratory rate and respiratory volume were measured, and in 2 subjects the eyeground was examined at the beginning and at the end of each exposure period, that is at 9 a. m., 11:45 a. m., 12:45 p. m. and about 4:30 p. m., the total exposure lasting, as a rule, eight hours with a half-hour intermission from 12 noon to 12:30 p. m. for lunch. In addition, the subjective findings were recorded and differential blood counts were made in the morning and in the afternoon. Samples of urine were collected during and at the end of the exposure and during the fourteen hours immediately following the experiment. These samples were analyzed for hippuric acid, in some instances for organic and inorganic sulfates, and for pathologic constituents such as sugar, albumin, acetone and occult blood. In several experiments 5 cc. of blood was withdrawn from the cubital vein of 2 of the subjects at the end of the eight hours' exposure for the purpose of determining the toluene level in the blood. During their sojourn in the chamber the subjects were occupied, as far as possible, with their usual routine work, in order to eliminate the effect of monotony and lack of occupation. Chart 1 illustrates

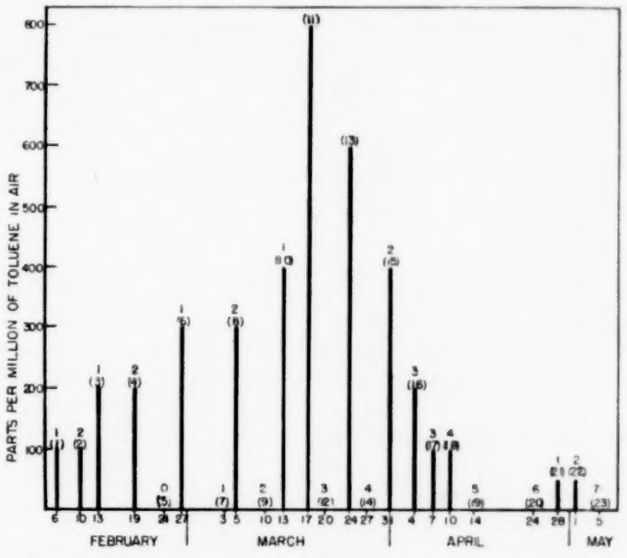

Chart 1.—The sequence of the different experiments. The figures in parentheses give the numbers of the individual experiments and those placed above them give the sequence of those experiments performed with equal concentrations.

From the Division of Industrial Hygiene, National Institute of Health.
Read before the Industrial Hygiene Session at the seventieth annual meeting of the American Public Health Association, Atlantic City, N. J., Oct. 16, 1941.

1. Cole, P. A., and Armstrong, D. W.: Analysis of Toluene and Benzene by Ultraviolet Absorption of Vapor Mixtures and the Determination of Concentration of Toluene in Air by the Use of the Rayleigh-Jeans Interference Refractometer, J. Optic. Soc. America, to be published. Armstrong, D. W., and Cole, P. A.: Use of the Rayleigh-Jeans Interference Refractometer in Controlling Concentrations of Organic Vapors in Air, J. Indust. & Engin. Chem. (Anal. Ed.), October 1941.

2. von Oettingen, W. F.: Toxicity and Potential Dangers of Aliphatic and Aromatic Hydrocarbons, Pub. Health Bull. 255, U. S. Government Printing Office, Washington, 1940.

3. Armstrong, D. W.: Use of the Rayleigh-Jeans Interference Refractometer in Controlling Concentrations of Toluene in Air, J. Optic. Soc. America, to be published.

the sequence of the different exposures and the concentration of toluene in the air used in each experiment. It shows also that not more than two experiments were performed a week in order that there should be sufficient time in between for recovery.

With regard to changes of the blood picture, it appeared unlikely that the red blood cells would show any significant changes in these acute experiments, and for this and other reasons only variations of the white blood cell count and changes of the white blood cell picture were studied in these experiments. For these counts blood was withdrawn in the morning at the beginning of the exposure and in the afternoon toward its end. The daily counts showed some variations, but in the course of the day or during exposure to toluene, as compared with control days.

It appears, therefore, that exposure to various concentrations of toluene, ranging from 50 to 800 parts per million under the conditions of these experiments over a period of eight weeks, as outlined in chart 1, does not produce any significant variations of the white blood cell picture.

Chart 2 illustrates the variations in the systolic blood pressure under the influence of various concentrations of toluene. With sojourn in the exposure chamber without exposure to toluene, all 3 subjects showed a fall of the systolic blood pressure during the morning and afternoon sessions which, in six experiments,

TABLE 1.—*Behavior of the White Blood Cells, With and Without Exposure to Toluene Vapors*

Leukocyte Count				Differential Count							
No. of Counts	Time	Range	Average	No. of Counts	Time	Lympho-cytes	Poly-morpho-nuclears	Band Cells	Eosino-phils	Baso-phils	Mono-cytes
					SUBJECT A						
35	a.m. and p.m.	6.3-11.1	8.0	26	a.m. and p.m.	33.3	59.3	1.0	1.1	0.3	5.0
17	a.m.	6.3-10.5	7.8	13	a.m.	30.0	62.0	1.4	1.0	0.3	5.3
18	p.m.	6.6-11.1	8.3	13	p.m.	37.3	55.7	1.1	1.0	0.3	4.6
					Exposure Days						
22	a.m. and p.m.	6.3-10.5	7.9								
11	a.m.	6.3-10.5	7.8	8	a.m.	29.0	63.0	1.5	1.0	0.5	5.0
11	p.m.	6.6- 9.1	8.0	8	p.m.	38.8	54.7	1.0	1.0	0.2	4.3
					Control Days						
13	a.m. and p.m.	6.5-11.1	8.2								
6	a.m.	6.5- 9.5	7.5	5	a.m.	29.4	62.0	1.4	1.0	0.2	6.0
7	p.m.	7.2-11.1	8.8	5	p.m.	34.8	57.2	1.2	1.2	0.4	5.2
					SUBJECT B						
41	a.m. and p.m.	5.3-10.9	7.5	39	a.m. and p.m.	35.0	57.4	1.1	1.0	0.4	5.1
20	a.m.	5.3- 9.0	7.4	20	a.m.	30.8	62.1	1.2	0.9	0.4	4.6
21	p.m.	5.9-10.9	7.4	19	p.m.	39.3	52.6	1.0	1.3	0.4	5.4
					Exposure Days						
27	a.m. and p.m.	5.9- 9.0	7.4								
13	a.m.	6.1- 8.5	7.6	13	a.m.	31.4	61.0	1.4	1.0	0.5	4.7
14	p.m.	5.9- 9.0	7.3	12	p.m.	40.0	50.5	1.0	2.0	0.5	6.0
					Control Days						
14	a.m. and p.m.	5.3-10.9	7.6								
7	a.m.	5.3- 9.0	7.4	7	a.m.	29.7	64.0	1.0	0.7	0.3	4.3
7	p.m.	6.5-10.9	7.7	7	p.m.	38.0	55.7	1.0	0.6	0.2	4.5
					SUBJECT C						
19	a.m. and p.m.	7.6-12.4	10.1	19	a.m. and p.m.	32.8	58.3	1.3	2.6	0.0	5.0
9	a.m.	8.5-11.8	10.8	9	a.m.	27.0	65.1	1.5	1.8	0.0	4.1
10	p.m.	7.6-12.4	9.5	10	p.m.	38.0	52.2	1.2	3.3	0.0	5.3
					Exposure Days						
12	a.m. and p.m.	8.5-12.4	10.4								
6	a.m.	10.0-11.4	10.8	6	a.m.	27.2	65.3	1.5	2.0	0.0	4.0
6	p.m.	8.5-12.4	10.0	6	p.m.	39.0	51.0	1.2	3.0	0.3	5.5
					Control Days						
7	a.m. and p.m.	7.6-11.8	9.5								
3	a.m.	8.5-11.8	10.6	3	a.m.	26.0	65.0	2.0	2.0	0.0	5.0
4	p.m.	7.6-10.0	9.0	4	p.m.	36.0	54.0	1.0	4.0	0.0	5.0

these could in no way be correlated to the intensity of the exposure or to the duration of the entire study, and for this reason only the average counts on subjects A, B and C in general, during exposure days and on control days, are given in table 1.

This table shows that the average total leukocyte counts of all 3 subjects did not vary appreciably in the morning and afternoon samples, either during exposure or on control days. There was, as a rule, a slight increase of the lymphocytes toward the afternoon. This was paralleled by a corresponding decrease of the polymorphonuclear leukocytes. During exposure to toluene vapors these changes were slightly more noticeable but not sufficiently significant to be indicative of any toxic effect. Band cells, eosinophilic and basophilic cells and monocytes did not show any significant changes, showed variations similar to those observed with different exposures to toluene. During the lunch period there was generally a tendency of the systolic blood pressure to increase. It should also be pointed out that the initial preexposure pressure showed considerable variation. With exposure to toluene the fall of the blood pressure was frequently more noticeable during the morning than during the afternoon, but the fluctuations never exceeded 18 mm. of mercury and are, therefore, within the limits observed in normal persons when active and when at rest, which, according to Wiggers,[4] may vary between 15 and 30 mm. of mercury. Analysis of the data presented in chart 2 does not show any relation between the changes of the

4. Wiggers, C. J.: Physiology in Health and Disease. Philadelphia, Lea & Febiger, 1937.

systolic blood pressure and the concentration of toluene in air or the sequence of the experiments as illustrated in chart 1.

Chart 3 illustrates the variations in the diastolic blood pressure. This was measured by recording the first disappearance of the pulse sound because it was felt that this could more readily be determined in the presence of the noise from fans than the baffling of the sound which is usually considered as an indication of the diastolic blood pressure. This is, according to Wiggers,[4] 5 mm. higher with the latter than with the former method and, accordingly, the true diastolic blood pressure is about 5 mm. higher than that given in chart 3. As may be seen from this chart, the behavior of the diastolic blood pressure varied with different persons during the experimental period without exposure to toluene, and various concentrations of toluene had no definite effect within normal limits, that is between 70 and 90 mm. of mercury.

Chart 4 illustrates the variations in the pulse pressure. It shows that the pulse pressure varied generally between 35 and 45 mm. in 1 subject (*A*) and between 40 and 50 mm. in the other 2 subjects or, after correction of the diastolic pressure, between 30 and 40 and

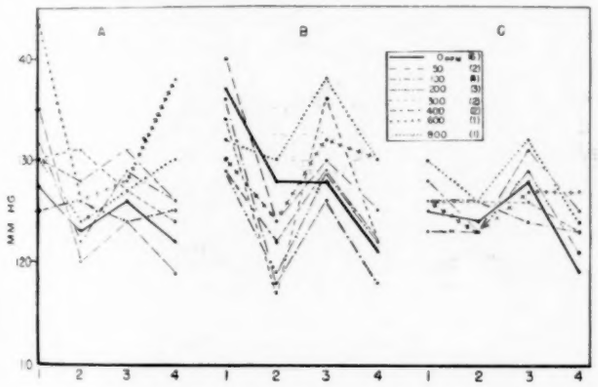

Chart 2.—Behavior of the systolic blood pressure of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

35 and 45 mm. of mercury, respectively, without showing any relation to the intensity of the exposure.

Chart 5 illustrates the variations in the pulse rate. It shows that the pulse rate varied generally between normal limits, that it decreased during the person's sojourn in the chamber and that there is no relation between the intensity of the exposure and the changes of the pulse rate.

These experiments indicate, therefore, that exposure of normal subjects to concentrations of from 50 to 800 parts per million of toluene in air for eight hours (in the case of 800 parts per million, for three and two hours a day with a two hour rest period in between) has no definite effect on the circulation.

In order to study the effect of inhalation of toluene vapors on the respiration, the respiratory rate and minute volume were determined at the beginning and at the end of each exposure period. The average results for each concentration are summarized in chart 6.

This chart shows that the two functions vary within normal limits, sometimes in opposite directions, and there is no definite relation between such changes and the concentration of toluene to which the subjects were exposed.

These experiments indicate, therefore, that exposure of normal subjects to concentrations of from 50 to 800 parts per million of toluene in air for eight hours (in the case of 800 parts per million, for three and two hours a day with a two hour rest period in between) has no definite effect on the respiration.

In respect to the effect of various concentrations of toluene in air on the nervous system, the observations

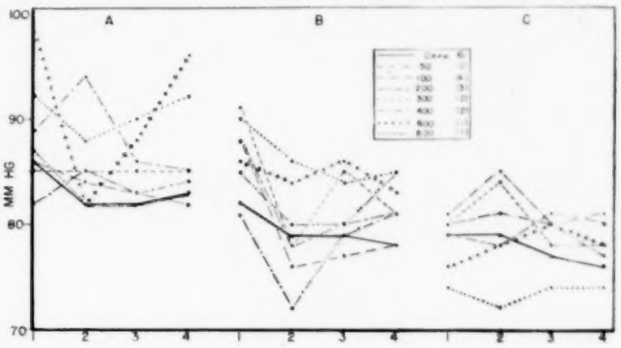

Chart 3.—Behavior of the diastolic blood pressure of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

refer mainly to subjective signs and symptoms which allow no accurate appraisal. For this reason they may be summarized as follows:

Sojourn in the exposure chamber for eight hours without inhalation of toluene vapors resulted in no complaints or objective symptoms except occasional, moderate tiredness toward the end of the experiment. This may be easily explained by lack of physical exercise, unfavorable illumination, monotonous noise (fans) and similar factors necessarily connected with an experiment of this type.

With exposure to 50 parts per million of toluene in air, A had no subjective complaints, whereas B complained, toward the end of the experiment, of drowsiness and very mild headache. On discontinuation of the exposure he completely recovered and had no aftereffects. In addition, at the end of the experiment the pupils of B were dilated and the accommodation to light was slightly impaired.

During exposure to 100 parts per million of toluene in air, 2 subjects (A and C) had no subjective complaints except for moderate fatigue and sleepiness and the third (B) complained, in addition, of a slight headache on one occasion. In contrast to these minor

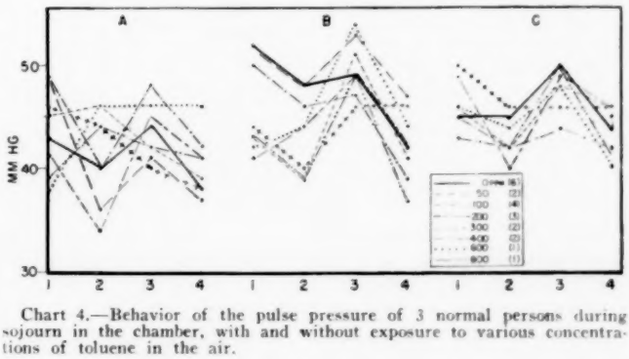

Chart 4.—Behavior of the pulse pressure of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

results in experiments 1 and 2, subjects A and B, who were exposed to the same concentration on two occasions after having been exposed to concentrations of 800 parts per million and lower concentrations of toluene in air in the course of the preceding three weeks, as indicated in chart 1, complained of extreme fatigue

during and after exposure. One (A) also showed moderate incoordination, and the other (B) complained, in addition, of severe headache, muscular weakness, nervousness and paresthesias and also showed, on one occasion, dilatation of the pupils at the end of the exposure.

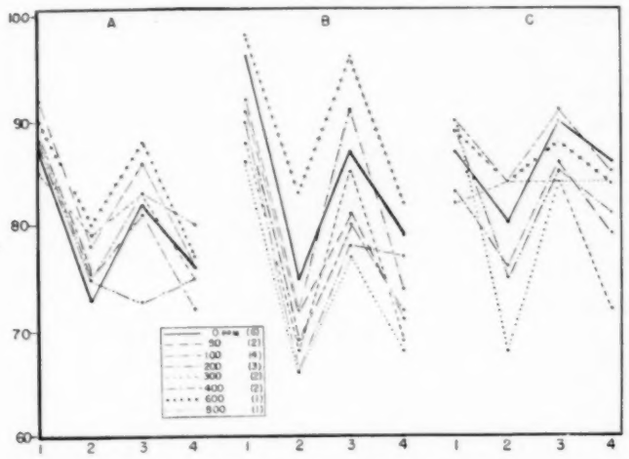

Chart 5.—Behavior of the pulse rate of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

With exposure to 200 parts per million of toluene in air, all 3 subjects felt fatigued toward the end of the experiment; 2 (B and C) experienced on several occasions muscular weakness, confusion and paresthesias of the skin, 1 (B) complained repeatedly of headache and 1 (C) complained of nausea at the end of the exposure. Two subjects (B and C) showed impaired coordination. In several instances the pupils were moderately dilated, the accommodation to light was impaired and the eyeground was engorged at the end of the exposure. During the hours following the exposure all 3 subjects felt more or less fatigued and confused generally and repeatedly complained of moderate insomnia and restless sleep.

With exposure to 300 parts per million of toluene in air, all 3 subjects experienced more or less severe fatigue, 2 (B and C) complained of headache and 1 (B) complained of muscular weakness. The latter also showed signs of incoordination. Two subjects (B and C) showed slight pallor of the fundus, but it was not determined whether accommodation to light was impaired. Several hours following the exposure, all 3 subjects felt more or less fatigued and 1 (B) complained of insomnia during the following night.

With exposure to 400 parts per million of toluene in air, all 3 subjects felt more or less fatigued during the exposure and showed signs of mental confusion. Two (B and C) complained of headache, paresthesias of the skin and muscular weakness and their pupils were dilated and the eyegrounds were slightly pale. The accommodation was not tested. Several hours following the exposure all 3 subjects felt more or less fatigued; 1 (A) experienced paresthesias of the skin, 1 (B) complained of headache and 2 (A and C) complained of insomnia during the following night.

Exposure to 600 parts per million of toluene in air caused, at the end of three hours, extreme fatigue, mental confusion, exhilaration, nausea, headache and dizziness and, in 2 subjects (B and C), severe headache. At the end of the eight hours' exposure they showed definite mental confusion and complained of weakness, dizziness and nausea. Objectively they showed considerable incoordination and staggering gait and, in several instances, the pupils were dilated, the accommodation to light was impaired and the optic disks were paler than normal. Several hours following the exposure all 3 subjects felt very tired and weak, nauseated and nervous and more or less confused; 2 (B and C) complained of severe headache and 2 (A and C) complained of insomnia. Fatigue and nervousness persisted on the following day.

Exposure to 800 parts per million of toluene in air rapidly resulted in severe fatigue, and after three hours' exposure all 3 subjects felt extremely nauseated, were very confused and showed lack of self control, considerable incoordination and staggering gait. In 1 subject (C) the accommodation of the pupils to light was strongly impaired, and in 2 subjects (B and C) the optic disk was paler than normal. All showed considerable after-effects lasting at least several days and characterized by severe nervousness, muscular fatigue and more or less severe insomnia.

These observations appear to indicate that exposure for eight hours to 200 parts per million of toluene in air produces definite impairment of certain nervous functions which, especially in hazardous operations, is liable to render persons thus affected dangerous to their own safety and to the safety of the operation. Higher concentrations become increasingly more dangerous in this respect, and exposure to concentrations of 600 and 800 parts per million should not be permitted for periods of three hours a day. At the present time we are not prepared to state after what duration of exposure such impairment of the nervous functions may result with different concentrations of toluene.

Attempts to correlate the intensity of the exposure with the odor of toluene were frustrated by the fact that the sensitivity of the olfactory nerve became rapidly paralyzed. With none of the concentrations tested was there any irritation of the mucous membranes other than a slight smarting of the eyes and nose.

One of the objectives of this study was to find a clinical test which would allow checking on previous

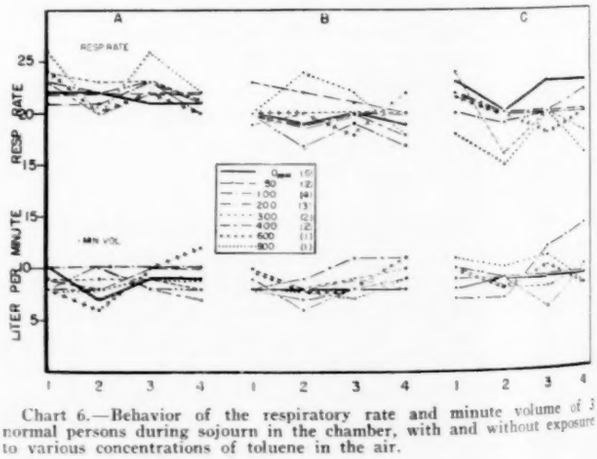

Chart 6.—Behavior of the respiratory rate and minute volume of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

exposures to toluene. As it was shown by Schultzen and Naunyn [5] and confirmed by numerous investigators that toluene is partly oxidized in the organism to benzoic acid and is excreted in conjugation with aminoacetic acid as hippuric acid, we decided to study the hippuric acid excretion as a possible criterion for exposure.

5. Schultzen, O., and Naunyn, Bernard: On the Behavior of Hydrocarbons in the Organism, Arch. der Physiol. 1867, p. 349.

The determination of hippuric acid in the urine was performed by Mr. P. J. Valaez of this laboratory with Quick's method, the modification described by Kraus and Dulkins[6] in 1941 being used. In this determination the urine is acidulated with acetic acid until acid to litmus and is concentrated to a volume of 150 cc. by evaporation. To this concentrated urine sodium chloride is added, while heating and stirring, until a total of 45 Gm. has been added (30 Gm. per hundred cubic centimeters). The saturated solution is then cooled to room temperature and, while one stirs and scratches the sides of the beaker, sulfuric acid of the concentration 1:1 is added, drop by drop, until no further precipitate of hippuric acid is formed. Although the amount of sulfuric acid required for this purpose may vary with different samples of urine, from 2 to 5 or 6 cc. of sulfuric acid is usually sufficient. In order to insure complete precipitation, additional sulfuric acid is added to the filtrate, and in case no further precipitation occurs the precipitate is allowed to stand for at least fifteen minutes and is then filtered. Both precipitate and beaker are washed repeatedly with a 30 per cent solution of sodium chloride which is free of sulfate ions, until the washings give a negative test for sulfate ions. When the washing is completed, precipitate and filter are transferred to the beaker in which the original precipitation was made, from 75 to 100 cc. of distilled water is added and the mixture is heated until the precipitate is dissolved. The hot solution is then titrated with 0.5 normal sodium hydroxide against phenolphthalein as indicator, and from the amount of sodium hydroxide used the quantity of hippuric acid is calculated. Whereas with concentrations of more than 300 mg. of hippuric acid per 150 cc. of urine this method gives fairly accurate results, these become increasingly less exact with lower concentrations because comparatively large quantities escape the precipitation. With this procedure the normal hippuric acid excretion in the urine within twenty-four hours was determined as 403 mg. (average of 6 persons), which is somewhat lower than that frequently quoted in the literature, namely 0.7 Gm.

The results of these determinations are tabulated in table 2, which shows that the amount of hippuric acid excreted increased, roughly, with the intensity of the exposure. In judging the validity of such determinations one should remember that ingestion of benzoates, as for instance in foods preserved with sodium benzoate, is liable to give erroneous results and, in addition, it appears possible that other individual variations which will be investigated in a later section may influence the excretion of hippuric acid, so that in case such determinations should be used as criteria for exposure to toluene certain precautions and restrictions should be considered. These experiments show further that, with exposure to concentrations of 50 to 800 parts per million of toluene in air, the excretion of hippuric acid during the fourteen hours following the exposure increases with the intensity of the exposure, but additional determinations made on samples of urine voided during the day following the exposure indicate that with exposure to such concentrations the hippuric acid excretion is practically complete when fourteen hours have elapsed after the termination of the exposure.

It appears, therefore, that exposure to concentrations of 50 to 800 parts per million of toluene in air is associated with and followed by an increased excretion of hippuric acid which is roughly parallel to the intensity of the exposure.

It is generally assumed that toluene is oxidized to benzoic acid and that no phenolic compounds are formed which could give rise to the excretion of ethereal sulfates in the urine, and Dakin[7] found no evidence for the oxidation of benzoic acid to an aromatic oxy acid. But in view of the fact that the determination of the ethereal sulfates has been accepted as a criterion for exposure to benzene, which is, to a large extent, oxidized to phenol in the organism, it appeared desirable to see whether or not there was any significant reduction in the excretion of inorganic sulfates. Because it was impossible to run both determinations (hippuric acid and inorganic sulfate) in all samples, the latter was

TABLE 2.—*Hippuric Acid Excretion in Man Following Exposures to Various Concentrations of Toluene*

No. of Experiment	Subject	Up to 12 Noon	Up to 5 P.M.	Up to 10 P.M.	Up to 7 A.M.	Total Excretion in Mg.	Volume of Urine in Cc.
		50 Parts per Million					
1 (21)	A	—	0	241	660	901	985
	B	0	0	0	0	0	1,175
2 (22)	A	0	0	428	0	428	835
	B	0	0	0	0	0	0
	Average	0		332			
		100 Parts per Million					
1 (1)	A	—	850	800		1,650	936
	B	—	560	L	L	>760	>980
	C	—	690	L	L	>690	>920
2 (2)	A	—	610	840	560	2,010	950
	B	0	765	0	0	765	1,222
	C	0	970	0	0	970	1,533
3 (17)	A	—	1,555	2,297	189	4,041	1,245
	B	379	240	0	0	619	2,225
	C	487	1,335	0	L	>1,822	>2,055
	Average	715		781			
		200 Parts per Million					
1 (3)	A	—	1,660	465	945	3,090	835
	B	540	1,475	0	L	>2,015	>1,280
	C	210	1,700	880	0	2,790	1,245
2 (4)	A	—	1,237	—	652	1,889	1,525
	B	0	1,335	0	0	1,335	2,210
	C	1,245	950	927	0	3,122	2,902
3 (16)	A	—	1,555	2,297	189	4,041	1,245
	B	379	240	L	L	>619	>920
	C	487	1,335	L	L	>1,822	>1,410
	Average	1,594		1,141			
		300 Parts per Million					
1 (6)	A	—	2,085	945	1,077	4,057	850
	B	617	1,842	248	L	>2,761	>1,640
	C	827	1,780	297	L	>2,913	>2,140
2 (8)	A	—	2,040	725	741	3,506	1,210
	B	312	1,520	L	L	>1,832	>2,605
	Average	2,206		1,294			
		400 Parts per Million					
7 (10)	A	—	2,428	1,146	1,073	5,079	1,645
	B	459	2,152	452	L	>3,063	>1,865
	C	—	363	1,940	L	>2,300	>1,985
2 (15)	A	1,016	1,918	1,161	1,264	5,359	950
	B	846	1,908	497	L	>3,251	>1,145
	C	743	2,405	875	1,800	5,823	2,610
	Average	2,372		2,659			
		600 Parts per Million					
1 (13)	A	—	3,300	2,100	1,503	6,933	1,300
	B	1,390	3,100	512	L	>4,921	>1,785
	C	650	2,757	1,448	1,455	6,260	3,043
	Average	3,708		3,253			
		800 Parts per Million *					
	A	—	2,609	L	1,239	>3,848	>1,005
	B	1,119	3,119	L	L	>4,238	>1,385
	C	527	1,466	1,894	2,278	6,165	3,030
	Average	3,013		4,172			

* In this experiment the exposure lasted only three hours in the morning and two hours in the afternoon.
— = no urine voided; L = urine sample missed or lost; 0 = less hippuric acid than could be determined.

6. Kraus, Ida, and Dulkins, Sol: The Determination of Hippuric Acid in Urine, J. Lab. & Clin. Med. **26**: 729 (Jan.) 1941.

7. Dakin, H. D.: Fate of Sodium Benzoate in the Human Organism, J. Biol. Chem. **7**: 103, 1909-1910.

determined only in samples which were sufficiently large to allow both determinations and which at the same time contained a large amount of hippuric acid.

Table 3 gives the results of these determinations and shows that there is no distinct reduction in the excretion of inorganic sulfates. These sulfates normally represent from 85 to 95 per cent of the total sulfates, but this ratio may be affected by changes of the bacterial flora in the intestinal tract and by the degree of putrefaction within the intestine.

It appears, therefore, that inhalation of toluene in concentrations of from 50 to 800 parts per million of air does not cause a decrease in the excretion of inorganic sulfates.

In addition, most of the samples of urine voided during and after the exposure were tested for the presence of acetone bodies by LeNoble's nitroprusside test, for albumin by the sulfosalicylic acid method and for occult blood by the benzidine test, all of which gave negative results. Analyses made for sugar by Benedict's qualitative test gave in the majority of samples from subject A and in about 50 per cent of the samples from subject B a very faint positive reaction which might be considered as indicating a trace of sugar. Such urines were usually very concentrated and contained a large amount of sediment, so that it appears questionable whether they were really indicative of sugar. In view of the observations of Dakin,[7] who noted, after oral administration of large doses of sodium benzoate (5 to 10 Gm. a day) to normal persons, a slight increase of the normal glycuronic acid content of the urine and similar observations of Quick,[8] Wagreich, Abrams and Harrow[9] and others, it appears reasonable to assume that the reduction in question was not produced by sugar but by small quantities of glycuronic acid.

TABLE 3.—*Comparative Effect of Inhalation of Toluene Vapors on the Excretion of Hippuric Acid and Inorganic Sulfates*

Number of Experiment	Subject	Hippuric Acid in Milligrams	Per Cent of Inorganic Sulfate
	300 Parts per Million		
1 (6)	A	2,035	86.9
	B	1,842	79.4
	C	1,789	90.4
2 (8)	A	2,040	84.0
	B	1,580	87.4
	400 Parts per Million		
1 (10)	A	2,428	85.0
	B	2,152	96.2
	600 Parts per Million		
1 (13)	A	3,300	79.5
	C	2,757	83.4
	800 Parts per Million		
1 (11)	A	2,609	87.6
	B	1,466	79.1
	C	3,119	67.6

In order to find out whether or not the determination of toluene in blood may be utilized for appraisal of the intensity of the exposure, the following experiments were carried out:

From the cubital vein of 2 of the subjects (B and C) 5 cc. of blood was withdrawn at the end of the exposure and the toluene content was determined with the method of Yant, Pearce and Schrenk[10] which was modified in several respects and on which Dr. Baernstein of our laboratory will report in the near future. The results of these determinations are summarized in table 4.

This table shows that the concentration of toluene in blood increases as its concentration in air increases. In order to find out to what extent these values could

TABLE 4.—*Concentrations of Toluene in Blood in Relation to Its Concentration in Air*

Concentration of Toluene in Air in Parts per Million	Date of Experiment	Number of Experiment	Concentration of Toluene in Blood, Mg./100 Cc.	Average Concentration in Blood, Mg./100 Cc.
200	2/13/41	3	B — 0.41	
	2/19/41	4	B — 0.43	
	4/ 4/41	16	B — 0.53	
	2/13/41	3	C — 0.66	
	2/19/41	4	C — 0.73	0.55
300	2/27/31	6	B — >0.64	
	3/ 5/41	8	B — 0.73	
	2/27/41	6	C — >0.60	>0.69
400	3/13/41	10	B — 0.94	
	3/31/41	15	B — 0.87	
	3/13/41	10	C — 1.17	0.96
600	3/24/41	13	B — >0.66	
	3/24/41	13	C — 0.95	>0.80
800	3/17/41	11	B — 2.64	
	3/17/41	11	C — 1.82	2.23

be duplicated in dogs, 3 dogs were exposed in experiment 6 simultaneously with the human subjects to concentrations of 300 parts per million of toluene in air, and the concentration of toluene in their blood was determined at the end of the experiment. This was found in 2 animals to be 0.74 and 0.79 mg. per hundred cubic centimeters of blood, and in the third, in which the sample was smaller than usual, 1.04 mg. per hundred cubic centimeters. These first two values check very well with the 0.73 mg. per hundred cubic centimeters which was found in the human beings in the same experiment. It appears, therefore, that dogs can be well utilized for such determinations.

These experiments indicate that the concentration of toluene in blood increases with its concentration in air and that concentrations of around 0.5 mg. per hundred cubic centimeters of blood may already cause definite impairment of certain nervous functions.

SUMMARY

Our studies indicate that single exposures of human beings for eight hours daily to concentrations of toluene ranging from 50 to 800 parts per million do not cause definite changes in the white blood cell picture, in the circulation or in the respiration. Inhalation for eight hours of concentrations of 200 parts per million causes slight but definite impairment of coordination and reaction time which is liable to render persons thus affected dangerous to their own safety and to the safety of the operation. With higher concentrations these effects become increasingly more severe, and with concentrations of 600 and 800 parts per million they may be observed after a few hours exposure.

Elimination of hippuric acid in the urine and concentration of toluene in the blood increase with the concentration of toluene in air. In contrast to experience with benzene, the ratio of inorganic sulfates in the urine is not noticeably affected by exposure to toluene.

[Since this preliminary report was presented, acute and continued animal experiments on dogs and rats have been carried out which confirm these findings and which will be published in the near future as a Public Health Service Bulletin.]

8. Quick, A. J.: The Study of Benzoic Acid Conjugation in the Dog With a Direct Quantitative Method for Hippuric Acid, J. Biol. Chem. **67**: 477 (Feb.) 1926.

9. Wagreich, H.; Abrams, A., and Harrow, B.: Detoxification of Benzoic Acid by Glucuronic Acid in Humans: Rate of Detoxication, Proc. Soc. Exper. Biol. & Med. **45**: 46 (Oct.) 1940.

10. Yant, W. P., Pearce, S. J., and Schrenk, H. H.: A Microcolorimetric Method for the Determination of Toluene, Washington, D. C., Bureau of Mines Reports, Investigation, 3323, 1936.

EFFECT OF EXPOSURE TO KNOWN CONCENTRATIONS OF CARBON MONOXIDE

A STUDY OF TRAFFIC OFFICERS STATIONED AT THE HOLLAND TUNNEL FOR THIRTEEN YEARS

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The Public Health Service and the Bureau of Mines have recently had occasion to make a series of clinical and laboratory examinations which it is believed will be useful in defining the region of safe exposure to carbon monoxide. The Port of New York Authority requested that a group of one hundred and fifty-six officers who had been assigned to duty in the Holland Tunnel in 1927 be examined to find out whether or not injury to health may have resulted from occupational exposure to carbon monoxide. These officers had been examined in 1932 by Bureau of Mines and Public Health Service physicians, but, because the findings were negative as far as occupational disease was concerned, and because funds for publication were limited at that time, a report was not published.

The opportunities for investigating the effects of long-continued exposure to low concentrations of carbon monoxide are unusually favorable in this group of men. In the course of their duties, tunnel officers are unavoidably exposed to small quantities of carbon monoxide liberated in exhaust gas. The carbon monoxide concentration in the tunnel atmosphere has been recorded continuously by means of automatic recorders throughout the entire period of thirteen years and four months, and thus the average concentration to which the officers are exposed and the range of their exposure are known. In general, during periods of normally moving traffic when ten thousand to sixteen thousand vehicles move daily through a single tube, the average exposure of officers on duty in the tunnel is approximately 0.7 part of carbon monoxide per 10,000 parts of air (70 parts per million). The atmospheric concentration infrequently exceeds 2.0 parts per 10,000 and rarely exceeds 3.0 parts per 10,000 and then for only a few minutes at a time. During periods of holiday traffic the average exposure is slightly higher. On the day the Holland Tunnel had the heaviest traffic load it has carried since it has been open, the average carbon monoxide concentration throughout a twenty-four hour period was 0.86 part of carbon monoxide per 10,000 parts of air.

About half of these one hundred and fifty-six men are on regular tunnel duty. Their eight hour day is divided into four two hour periods in such a way that tunnel duty alternates with traffic duty on the plazas at the approaches and the exits of the tunnels. Tests showed that under ordinary conditions the carbon monoxide concentration prevailing at their posts on the streets is negligible. Other officers are stationed in emergency garages, which in function and equipment resemble fire department substations. No carbon monoxide could be demonstrated in the air. Other officers were assigned to desk duty and still others to duty outdoors.

These officers were selected after a preemployment medical examination. This minimizes, if it does not completely eliminate, the possibility that preexisting disease may have complicated these findings. In the intervening years there has been very little labor turnover, so that most of the men who began work in the Holland Tunnel in 1927 are available for examination. Their salaries have enabled them to eat well, to live in adequate quarters and to provide themselves with medical and dental care as it became necessary. All of these background conditions remove complications that might otherwise interfere with the interpretation of these data.

Further information on the conditions of their employment and a more complete presentation of the medical findings may be found in a recent Public Health Bulletin.[1]

The clinical examination, following the taking of the occupational history and the past and present medical history, was directed primarily at the cardiovascular and nervous systems. Laboratory procedures included an erythrocyte count, hemoglobin estimation by the Newcomer method, carbon monoxide-hemoglobin determinations by the Sendroy-Liu modification of the Van Slyke-Neill procedure, and tests for albumin and sugar in the urine. Teleoroentgenograms, 6 feet from target to film, were taken on all but the first thirty-two men, who were roentgenographed at 4 feet. When any abnormality of cardiac function was noted an electrocardiogram was made. Particular attention was devoted to getting a description of smoking habits, since this had a good deal of influence on the amount of carbon monoxide in the blood.

The officers took a friendly and intelligent interest in the study and were thoroughly cooperative throughout.

SYMPTOMS

Most of the officers were symptom free. When complaints of ill health were made they tended to be nonspecific and to occur singly. Generally they were not of such a degree of severity as to have prompted self medication or to have induced the subject to seek medical treatment. A number of officers volunteered the information that they experienced symptoms attributable to their work only at the end of hot, windless summer days, particularly when traffic had been unusually heavy. At such times toll collectors and officers on duty at street intersections reported that they often had throbbing headaches, frontal or bitemporal, sometimes accompanied by dizziness, anorexia, mild nausea and spots before their eyes. No complaints of headache were made at the time of the examinations in March 1941 or by any of the twenty toll collectors at the end of duty Sunday night, June 1, 1941, following a period of exceptionally heavy traffic.

Ten per cent of the officers gave a past history of headache associated with sinusitis, different in character from the headache that sometimes occurred in hot weather. No one complained of vomiting during or immediately after duty. Dyspepsia was an infrequent complaint. Two men gave a definite past history of gallbladder disease. Palpitation was reported by 8 per cent, cough by 3 per cent, weakness by 3 per cent,

From the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, Bethesda, Md. (Drs. Sievers and Edwards) and the U. S. Bureau of Mines Experiment Station, Pittsburgh (Drs. Murray and Schrenk).

1. Sievers, R. F.; Edwards, T. I., and Murray, A. L.: A Medical Study of Men Exposed to Measured Amounts of Carbon Monoxide in the Holland Tunnel for Thirteen Years, Pub. Health Bull., Washington, Government Printing Office, to be published.

drowsiness, usually in the summer, by 9 per cent, insomnia by 5 per cent and dyspnea of mild degree or occasional occurrence by 12 per cent. These do not seem to be unusual rates of incidence for symptoms of this degree in a population of men ranging in age from 32 to 51 years, averaging 41.

Ten officers reported that a diagnosis of peptic ulcer had been made at some time during the past eleven years by the family physician. Three of the men had scars that indicated operative treatment and several were still under active medicinal therapy. Only one man presented any objective signs that could be attributed to ulcers. He was 20 per cent underweight and had an erythrocyte count of 4.49 million cells per cubic millimeter and a hemoglobin content of 13.0 Gm. per hundred cubic centimeters. There seems to be no reason to believe that this represents an unusual finding for men of this age.[2]

PHYSICAL EXAMINATION

Cardiovascular Changes.—Since most types of heart disease early in their course are accompanied by enlargement of the heart, an effort was made to estimate the cardiac size of the traffic officers and compare them individually and as a group with other groups of men found or known to be free of heart disease. The best available method of determining heart size in the living subject is the measurement of the surface area of the heart shadow as noted on a teleoroentgenogram or by orthodiascopy. Hodges and Eyster [3] developed a formula for the prediction of cardiac area of orthodiagrams in the posteroanterior view based on three factors —height, weight and age. To make this formula applicable, it is necessary to establish a correction factor for teleoroentgenograms because of the divergent x-rays. The correction factor of 0.916 was determined by making an x-ray exposure of a tin plate 8 cm. from the film to be comparable to the average distance of the greatest transverse diameter of the heart from the film.

After the correction factor had been applied, the measured heart area of each traffic officer was divided by the area predicted by the Hodges-Eyster formula and the resulting ratios were expressed as percentage deviation from predicted value. Comparison was then made with two other groups treated in the same way. One of these groups, a series of ninety-eight men selected by Eyster as free of heart disease, is taken from a report published in 1927.[4] The third group of heart area measurements was obtained from chest films made at the last annual examination of employees of the Division of Industrial Hygiene, National Institute of Health. The average value and distribution of values of the three groups are in close agreement. Eyster's ninety-eight healthy subjects average 0.51 per cent more than the predicted heart area, the traffic officers are 0.17 per cent above the predicted average and the male personnel of the Division of Industrial Hygiene have heart measurements 0.75 per cent above the predicted value. As a result of these comparisons, it appears safe to conclude that the hearts of these men have not been damaged by conditions associated with their employment that would be reflected by roentgenographic study.

Three of the men presented electrocardiographic findings suggestive of myocardial damage. One man had had several coronary attacks, the second had auricular fibrillation and definite shortness of breath on exertion and the third had no symptoms, but coronary disease was suspected on the basis of electrocardiographic findings, heart enlargement and poor response to the exercise test.

The response of the heart to a vigorous exercise test uncovered several instances of cardiac impairment. An attempt to relate carbon monoxide hemoglobin values ranging from 0.5 to 13.1 per cent saturation with cardiac response to exercise failed to demonstrate any significant degree of correlation. As a group the post-exercise pulse (two minutes after exercise) was slightly less than the preexercise rate, which may be taken as an indication of a good cardiac reserve. A small number of men, most of them overweight, had pulse rates that failed to return within a reasonable rate of the resting pulse rate.

Further examination of the cardiac system did not reveal any unusual group findings. The average pulse rate of 80.6 beats per minute compares favorably with the average noted in several previous field studies. A resting heart rate of 100 or more beats per minute was found in 7 per cent of the men. The blood pressure readings brought forth average systolic values for each age group that were 10 mm. of mercury lower than found on other studies,[5] and no apparent change in average diastolic pressure. The lower systolic value was thought to be related in part to taking more than one blood pressure reading and recording the lowest value, whereas in previous studies only one reading was ordinarily made on each man.

Hypertension, defined as a systolic pressure of 150 mm. of mercury or more, was noted in only five officers. The highest systolic reading was 164 mm. of mercury.

Tentative diagnosis of heart disease on the basis of a number of findings such as irregular pulse, elevated blood pressure, enlarged heart and abnormal electrocardiographic tracings was established on four officers. Coronary heart disease with slight myocardial damage was demonstrated in the electrocardiographic tracings of three officers. The diagnosis of hypertensive heart disease was made on the fourth officer. The findings obtained during this study were too inconclusive in a fifth man to establish a diagnosis of adhesive pericarditis, which could only be suspected. Only one man who had a history of previous coronary attacks was partially incapacitated for general activities and has been placed on light duty, which he performs without difficulty.

Nondisabling cases of this degree are not uncommon in employed populations, and this rate of incidence is, if anything, lower than usual.

Neurologic Changes.—Careful observations were made for tremors, spasticity, rigidity, response to vibratory sensation, coordination tests and tendon reflexes. A fine tremor of the outstretched hand, mild in degree, was observed in 12.5 per cent and to a moderate degree in 5 per cent of the officers examined. Two per cent of the officers had a coarse tremor of moderate degree. The tremors were associated in one instance with mild hyperthyroidism and with the effects of a recent heavy alcoholic bout in another case. A third officer had a

2. Jennison, Janette: Observations Made on a Group of Employees with Duodenal Ulcer, Am. J. M. Sc. **196:** 654-662 (Nov.) 1938.

3. Hodges, P. C., and Eyster, J. A. E.: Estimation of Cardiac Area in Man, Am. J. Roentgenol. **12:** 252-265 (Sept.) 1924.

4. Eyster, J. A. E.: Size of Heart in Normal and in Organic Heart Disease, Radiology **8:** 300-306 (April) 1927.

5. Britten, R. H., and Thompson, L. R.: A Health Study of Ten Thousand Male Industrial Workers, Statistical Analysis of Surveys in Ten Industries, Pub. Health Bull. 162, Washington Government Printing Office, 1926.

poorly regulated diabetic condition which may have accounted for some of his tremor. No true cases of intention tremor were noted. Based on the experience of past field studies, these figures are slightly lower than those previously reported. The response to vibratory sensation produced by a tuning fork was normal in each instance. No neurologic disturbances could be demonstrated by abnormal tendon reflexes. The coordination tests, such as finger to finger and finger to nose, were properly executed by each subject. Spasticities and rigidities of muscles, speech disturbances and abnormal gaits were not found.

An excellent psychomotor test for judging the integrity of the nervous system was available in the form of marksmanship records obtained annually on the pistol range. There was no significant difference in the scores of ninety tunnel officers who had worked longer than thirteen years as compared with one hundred and twenty-four officers on duty for shorter periods of time. The subjects noted with tremors of moderate degree, either fine or coarse, had an average pistol score significantly less than the pistol score of the entire group. Men with slight tremors had as good a pistol score on the average as other officers. The Port Authority pistol team composed of seven officers, six of whom had tunnel duty, has finished in first or second place in formal competition in a league made up of pistol teams representing police organizations in northern New Jersey every year since 1935.

Other Findings.—The results of the visual acuity test of the traffic officers compare favorably with data of two other groups of employed men of similar age distribution.[6] A number of the officers presented evidence of eye irritation manifested as simple scleral injection of a mild degree. This irritation may have been due to dust exposure, indicated by layers of dust deposited on the margin of the eyelids.

The remainder of the physical examination covering such organs as the ear, nose, throat and chest, including roentgenograms of the lung fields, yielded no unusual abnormalities. The subjects as a group were noticeably overweight, even after allowances were made for constitution type, for these men were selected on the basis of sturdy physique. There is no evidence as yet that conditions associated with obesity, such as degenerative diseases of the heart and kidney, have had any deleterious effects on these men.

LABORATORY EXAMINATION

The amount of hemoglobin combined with carbon monoxide is directly related to smoking habits. The effects of smoking without other carbon monoxide exposure had the following mean values for percentage carbon monoxide-hemoglobin saturation: (*a*) for twenty-one nonsmokers 1.71, a figure which is in good agreement with the corresponding value of 1.5 per cent reported by Hanson and Hastings [7] for a similar group; (*b*) for thirty-nine smokers averaging less than one pack of cigarets daily 4.10, and (*c*) for twenty-one smokers averaging a pack of cigarets or more a day 5.35.

The carbon monoxide-hemoglobin values of the officers examined in March 1941 during the time of this study varied from 0.5 to 13.1 per cent saturation. The highest values were obtained on subjects who smoked and were exposed to heavy traffic on the upgrade section of the tunnel, where atmospheric carbon monoxide readings averaged slightly more than 100 parts per million for a two hour period. (Blood samples were taken shortly after the first or second two hour tour of duty in the tunnel.) Nonsmokers with this degree of exposure had carbon monoxide-hemoglobin values that were proportionately less. It was observed that the levels of carbon monoxide in the blood of nonsmoking traffic officers stationed in the tunnel during two hours of average exposure fell within the same range of carbon monoxide-hemoglobin values found in cigaret smokers with no occupational exposure to carbon monoxide.

The average erythrocyte count of these men was 5.2 million cells per cubic millimeters, a value in close agreement with the average found by Osgood on one hundred and thirty-seven medical students.[8] The hemoglobin content of the blood averaged 14.38 Gm. per hundred cubic centimeters (Newcomer method). Previous field studies using the same instrument gave similar hemoglobin values. No association of erythrocyte counts or hemoglobin values with carbon monoxide-hemoglobin levels was found.

Glycosuria and albuminuria did not exceed the expected ratios of incidence.

EXPOSURES IN INDUSTRY

These observations on men exposed daily for thirteen years to an average concentration of 0.7 part of carbon monoxide per 10,000 parts of air in their working environment are of added importance because this is about as great an exposure as has so far been observed in most shops, mills and workrooms where carbon monoxide is known to escape into the breathing zone. Careless use of gasoline engines, of course, can readily create greater carbon monoxide concentrations.

In recent months Public Health Service engineers have been engaged in a large scale industrial hygiene survey of arsenals and industrial establishments engaged in manufacturing operations related to national defense. Their assignment was to visit every workroom, study the materials and equipment and make whatever measurements were necessary to find out whether or not a health hazard existed. In the course of their work they encountered almost every major manufacturing process carried on in light and in heavy industry and made measurements with a MSA carbon monoxide indicator in every instance in which there was reason to suspect the presence of carbon monoxide in the atmosphere. In a small proportion of the workrooms they visited, measurable amounts of carbon monoxide were present in the breathing zone of the workers, but except for places where internal combustion engines were being operated the concentrations were well within the limits that prevail in the Holland Tunnel. Further information and references to the literature on the subject have been presented elsewhere.[1]

This should not be interpreted to mean that precautions against acute exposure can be relaxed. On the contrary, the control methods developed during planning

6. Jones, B. F.; Flinn, R. H.; Hammond, E. C.; Wulfeck, W. H.; Lee, R. H.; Donahue, D. D.; Specht, H.; Baernstein, H. D.; Channell, R. C.; Hough, J. W.; Jones, R. R., and Sayers, R. R.: Fatigue and Hours of Service of Interstate Truck Drivers, Pub. Health Bull. 265, Washington, Government Printing Office, 1941. Neal, P. A.; Dreessen, W. C.; Edwards, T. I.; Reinhart, W. H.; Webster, S. H.; Castberg, H. T., and Fairhall, L. T.: A Study of the Effect of Lead Arsenate Exposure on Orchardists and Consumers of Sprayed Fruit, Pub. Health Bull. 267, Washington, Government Printing Office, 1941.

7. Hanson, H. B., and Hastings, A. B.: The Effect of Smoking on the Carbon Monoxide Content of Blood, J. A. M. A. **100:** 1481 (May 13) 1933.

8. Osgood, E. E.: Hemoglobin, Color Index, Saturation Index and Volume Index Standards; Redeterminations Based on Findings in One Hundred and Thirty-Seven Healthy Young Men, Arch. Int. Med. **37:** 685-706 (May) 1926.

and operation of the Holland Tunnel should be extended to every situation in which human beings are exposed to carbon monoxide, particularly wherever internal combustion engines are operated in enclosed places.

SUMMARY

Examination of a group of one hundred and fifty-six Holland Tunnel traffic officers exposed throughout a period of thirteen years to an occupational carbon monoxide exposure averaging 0.7 part of carbon monoxide per 10,000 parts of air did not reveal any evidence of injury to health attributable to carbon monoxide exposure.

CONSERVATION OF HEARING IN INDUSTRY

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The consideration of this subject necessitates answers to two questions: 1. Is it generally recognized that hearing losses result from certain industrial hazards? 2. Can anything be done and is anything being done to prevent them?

The first of these must be answered in a qualified negative. Some hazards to hearing are recognized and preventive measures, either direct or indirect, are being taken to eliminate them. Other hazards, because of the peculiar type of hearing loss which they cause, are not being recognized and no concerted action toward conservation has been taken.

Recently an employer was asked what his reaction would be if some one asked permission to test the hearing of his employees. He replied that he preferred to let sleeping dogs lie. A locomotive engineer was asked if he would invite some members of his union to come to the laboratory for hearing tests. No charge was to be made and the results were to be confidential. None appeared for the tests. The medical officer in charge of a certain corps area, when asked if he knew of any studies relating to deafness from gunfire, replied that he knew of only one, that from the Office of the Surgeon General at the close of World War I. (Guild's [1] report of 1918 with reference to one hundred and forty studies had not come to his notice.) Officials of an aviation corporation, after being shown that five out of eight of their pilots had definite hearing losses, decided not to send other pilots for tests.

Why does this attitude exist? It appears that employers are not aware of or ignore these facts for fear that additional legal regulations will be invoked and questions of compensation arise. Laborers also evade the issue for fear it will bring about loss of employment or adversely affect tenure. It appears that employers and employees maintain the attitude of the traditional ostrich with his head buried in the sand. The subject appears to be a two edged sword which will cut in both directions, and the attitude toward deafness in industry has changed but little with our industrial development.

This pessimistic attitude may well be abandoned in the discussion before this group of scientists. The fact that the program committee assigned this subject indicates that some of its members believe certain industrial hazards do have a deleterious effect on hearing and that something ought to be done about it. If any action is considered, an examination of some of the conditions of employment and their relationship to hearing defects is necessary for a more complete understanding of the problems involved. The rights of both employer and employee deserve equal and fair consideration.

First, but not necessarily the most important of the conditions which may be analyzed, are those occupations in which it is necessary for workmen to be exposed to extreme and rapid variations in the temperature without adequate protection. If these exposures result in upper respiratory infections, otologists will generally agree that they may adversely affect the hearing. If suppurative otitis media results, careful otologic treatment may prevent measurable hearing losses, but repeated infections of this kind are almost certain to result in defective hearing. It is also claimed by some that, if a mild form of hyperplastic otitis media exists, repeated upper respiratory infections tend to lower the level of hearing still more.

In some occupations active steps have been taken to eliminate sudden extreme temperature changes. In the new Diesels the engineers are in enclosed compartments which are as comfortable as one's own living room. Modern automatic stokers and oil burners now furnish power to drive our ships, and the man with the shovel in the boiler room is a thing of the past. The enclosed cabins of our modern airplanes to a limited extent protect the ears of passengers and pilot—if the windows are not opened—both from temperature changes and from the terrific motor and propeller noises.

No one would be so naive as to think that these innovations were brought about because of a desire to preserve hearing. Nevertheless, they do prevent hearing losses to a greater or lesser degree.

In addition to the acute otitis media which is so often an accompaniment of upper respiratory infections, certain flight surgeons (e. g. Armstrong) have described a new form of middle ear involvement called aero otitis media, which is thought to be peculiar to aviators. It also may cause hearing losses. Since it lowers the aviators' efficiency or incapacitates them for a limited time, its prevention is a vital problem in our present crisis. We can be sure that hearing losses from aero otitis media will be prevented, not particularly to conserve the hearing, but because it is necessary to keep the aviator fit for his job.

Hearing losses occur at times in laborers who are subjected to sudden wide variations in atmospheric pressure. It has repeatedly been reported in caisson workers. Figure 1 shows the audiograms of 2 patients whose hearing losses resulted from the accidental lowering of atmospheric pressures while they were engaged in sewer and bridge construction. Since this type of deafness is but one manifestation of a generalized systemic involvement, its prevention has been brought about, except in accidental cases, through the safety regulations which are now being rigidly enforced in this industry. The use of compressed air machinery and explosives in caisson construction add another hazard to hearing which is not generally recognized. This will be discussed in detail in a later section.

Unfortunately, caisson workers are not the only ones who are at times subjected to extremes of atmospheric pressure. Rather indefinite reports have reached the public that effects somewhat similar to those encountered in caisson workers have been found among aviators who fly our modern speedy pursuit ships and bombers. If this is true it is certain that preventive

From the Northwestern University School of Speech.

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

1. Guild, S. R.: Otopathies of War, Internat. A. M. Museums, Bull. 7, 1918, p. 225.

measures are being taken in response to the new immediate demands for physical efficiency in fliers.

These few brief examples have been cited to show that steps are being taken in certain industries which tend to conserve hearing. These steps are not primarily for this purpose and in them conservation of hearing is a by-product of other preventive measures. In none is it evident that conservation of hearing was of first importance. Only isolated efforts are aimed directly at preventing hearing losses.

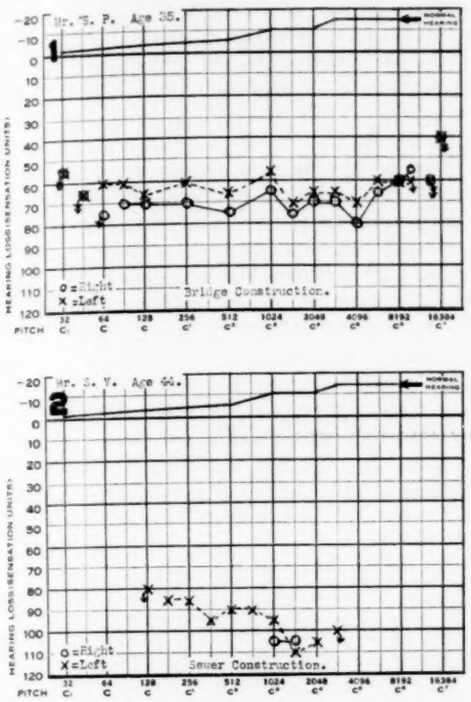
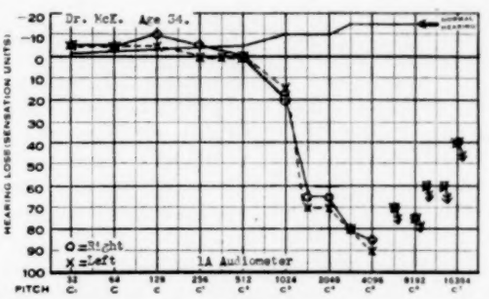


Fig. 1.—Audiograms showing bilateral hearing loss in two caisson workers. The small arrows indicate that certain tones were not heard at the maximum intensity of the 1 A Western Electric audiometer.

It has been known for many years that certain industrial hazards have a deleterious effect on hearing without producing other measurable systemic changes. Fosbroke [2] called attention to deafness among blacksmiths more than one hundred years ago. Those engaged in blacksmithing were but a small part of the total population, and medical textbooks of that time paid little attention to Fosbroke's observation. Knowledge of the anatomy, physiology and pathology, as well as therapy, of the ear was very limited. Otology had not been thought of as a medical specialty. It remained for Barr [3] and his contemporaries of the 1880's to diagnose excessive noise as the cause of deafness among boilermakers and foundrymen, and the otologic textbooks at the turn of the century gave "boilermakers' deafness" as a separate clinical entity. Bezold and Siebenmann's [4] textbook of 1908 states that "the most frequent injury to the inner ear is that from excessive noise, the acoustic trauma." However, the points for differential diagnosis between this and other forms of perceptive type deafness were not established, and little or nothing was done to eliminate this hazard to hearing. In fact, Gilbert, a medical inspector of factories in Belgium, attempted in 1921 to bring this subject to the attention of the public and the medical profession. He [5] stated "The influence of noise which is at times deafening has been little studied . . . it seems wise . . . to introduce so important a subject."

Although blacksmithing as an occupation has almost disappeared, modern industry is becoming more noisy. The compressed air hammer has replaced the manually operated sledge. Gasoline and steam engines with explosive exhausts are universally employed. Presses for forming metal plates are larger than ever. The nation with the most powerful explosive is in a strategic position. The ear has remained unchanged and is more susceptible to these traumatic influences.

The 1926 edition of Politzer's [6] textbook and the opinions of other teachers of that day seem to have created an impasse concerning the diagnosis of deafness from noise. Politzer wrote "These concussions of the internal ear produced either by direct violence to the head or by detonations, in which the external meatus and the membrana tympani present a normal appearance, are absolutely incapable of being judged from the medicolegal standpoint. The reasons for this are: (1) it cannot be positively proved that the paralysis of the auditory nerve is due to the presumed injury, and (2) even if the traumatic violence be established, it cannot be positively determined whether the paralysis of the acoustic nerve has not existed prior to the time of injury." In the same volume Politzer weakened his stand by stating that "one therefore observes in locksmiths, blacksmiths, boilermakers, mechanics, iron-turners, file-makers, plate-makers, tinkers, engineers, stokers, as well as persons working in noisy machine shops, an increasing diminution in hearing power and persistent subjective noises which increase in intensity through excessive irritation of the auditory nerve."



RIGHT EAR				HEARING GRADE	LEFT EAR			
1	2	3	4		5	6	7	8
54	56	85		30	48	55	48	
41	68	83		27	23	54	63	
84	63	42		24	66	88	83	
51	14	18		21	41	42	32	
78	34	61		18	81	23	85	
23	12	35		15	68	85	63	
32	31	32		12	21	86	18	
11	63	44		9	15	64	24	
48	88	53		6	43	58	88	
38	81	66		3 →	XX	32	15	
36	36	XX		0	XX	1X	XX	
51	12	45	← 4A Audiometer		XX	XX	XX	

Fig. 2.—Tests made with the 4 A (phonograph) audiometer show no loss in the right ear for spoken numbers and only 3 units loss in the left. The record of the same man with the 1 A audiometer shows bilateral loss for tones above 1,024 double vibrations.

2. Fosbroke, J.: Pathology and Treatment of Deafness, Lancet **1**: 845, 1830-1831.

3. Barr, Thomas: Injurious Effects of Land Sounds on the Hearing of Boilermakers and Others Who Work Amid Noisy Surroundings, Proc. Glasgow Phil. Soc. **17**: 223, 1886.

4. Bezold, F., and Siebenmann, F.: Textbook of Otology, translated by Jaques Holinger, Chicago, E. H. Colegrove Company, 1908, p. 280.

5. Gilbert, D. J.: Influence of Industrial Noises, J. Indust. Hyg. **3**: 264, 1921-1922.

6. Politzer, Adam: Diseases of the Ear, Philadelphia, Lea & Febiger, 1926.

More accurate hearing tests which became possible with the development of modern audiometers did not immediately result in a clearer description of the deafness caused by excessive noise. Studies that I[7] made in 1937 and the study by Larson[8] in 1938, that by Dickson, Ewing and Littler[9] in 1939 and that most

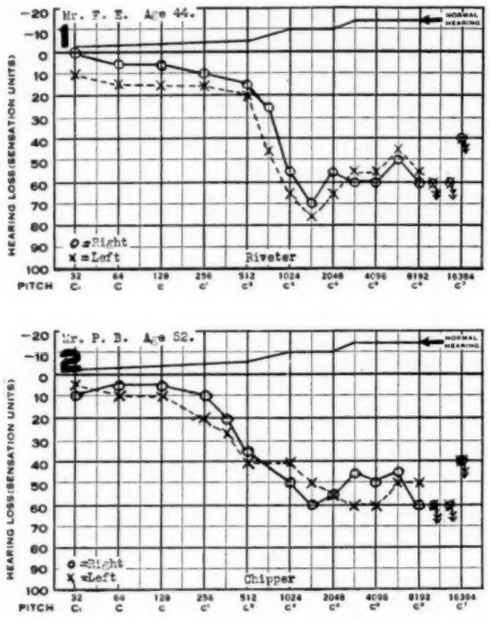


Fig. 3.—Audiograms of a riveter and a foundry "chipper" which show losses at 512 and 1,024 double vibrations. Both had considerable difficulty in hearing conversation.

recently by Perlman[10] in 1941 give a more accurate description of traumatic deafness and it is now possible in a great many cases to distinguish it from that having other causation. The study by Dixon, Ewing and Littler was especially important. In this study young men whose hearing had previously been tested were exposed to measured airplane noises for definite periods of time and the tests were repeated after exposure. They found which men were susceptible to this noise, the amount of temporary damage, the rate of recovery, how much exposure was required to produce permanent hearing loss and what could be done to prevent it in those who must of necessity follow this occupation.

It is true that others mentioned had previously described this type of deafness, but no one had been able to establish the cause and effect relationship so definitely. Politzer's statements are no longer true. We can now by actual tests determine whether a workman's hearing is normal before he enters an occupation and by tests repeated at desired intervals determine whether the hazards of that industry do cause hearing losses. The problem is no longer closed by tradition.

The nature of this particular type of loss may account for its lack of recognition in the past. Dickson, Ewing and Littler described some of its peculiarities as follows: "A loss of high tones is noted in persons exposed to aeroplane engine noise if the ears are not protected" and "No deafness amounting to disability is complained of unless the speech frequencies become involved." A case which is apropos is shown in figure 2, the record of a postgraduate medical student. He had been attending classes for several weeks and neither he nor his instructors were aware that he had any hearing loss. The defect was discovered in routine tests. The record shows a bilateral loss for high tones with no loss at all for tones below 1,024 double vibrations. His hearing for spoken voice when tested with a phonographic audiometer (4 A Western Electric) showed no loss at all in the right ear and only 3 decibels loss in the left. (In group schoolroom tests with this instrument, losses of 6 decibels or less are usually considered of no practical significance.) Had this young man been interviewed by a prospective employer who depended on conversational voice to eliminate candidates who were hard of hearing, no loss would have been detected. It may be said that for his professional work he had no handicap at all and that losses of this extent need receive no consideration as far as industry is concerned. It will be shown later that this is not necessarily true.

This man, in addition to having been an aerial observer, was a machine gunner in the National Guard. It is obvious that no proof as to the cause and effect relationship has been established.

Dickson, Ewing and Littler's statement that "no deafness is complained of unless the speech frequencies become involved" is illustrated in this case. According to Miller[11] the vowel sounds are made up of complex patterns of tones with frequencies between 300 and 3,000 double vibrations. The frequency of most of the consonant sounds is somewhat higher. This man, who had marked hearing loss for tones above 2,048 double vibrations, had no apparent difficulty in understanding conversation. This experience is common to all who use the telephone. People think they hear well over the telephone until they attempt to speak a proper name and discover that it must be spelled before it can be understood. This is because the high tones of the voice which carry the distinguishing characteristics of the consonant sounds are carried inefficiently by the telephone.

Figure 3 shows the audiograms of two men whose acuity for tones between 512 and 1,024 double vibrations was considerably diminished. Both of them had considerable difficulty in understanding conversation. The first man had been a "chipper" in a foundry for twenty years and the second a boilermaker-riveter for

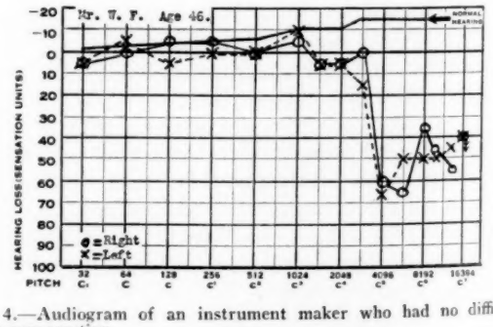


Fig. 4.—Audiogram of an instrument maker who had no difficulty in hearing conversation.

ten years. The hearing loss in each case was a very definite handicap, since speech frequencies were affected.

Again there is no proof that a cause and effect relationship exists, but it is not difficult to understand why Politzer, working with less accurate equipment for determining the acuity of hearing, made the statement

7. Bunch, C. C.: Diagnosis of Occupational or Traumatic Deafness: A Historical and Audiometric Study, Laryngoscope **47**: 615 (Sept.) 1937.
8. Larson, B.: Investigation of Professional Deafness in Shipyard and Machine Factory Labourers, Acta oto-laryng., 1939, supp. 36, p. 3.
9. Dickson, E. D. D.; Ewing, A. W. G., and Littler, T. S.: Effects of Aeroplane Noise on Auditory Acuity of Aviators, J. Laryng. & Otol. **54**: 531 (Sept.) 1939.
10. Perlman, H. B.: Acoustic Trauma in Man, Arch. Otolaryng. **34**: 429 (Sept.) 1941.
11. Miller, D. C.: The Science of Musical Sounds, New York, Macmillan Company, 1934, p. 215 ff.

that it is impossible to judge these cases from the medicolegal standpoint.

Losses in acuity for tones higher than 3,000 double vibrations are at times somewhat incapacitating. Figure 4 shows the record of an instrument maker. None of his associates noted that he was hard of hearing. He

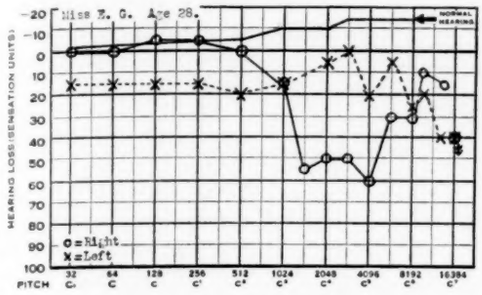


Fig. 5.—Audiogram of a telephone operator who was unable to understand numbers when she wore the receiver at her right ear.

was an expert watch maker. It was necessary for him to use a small megaphone at his ear when he listened to the high pitch sound of a watch tick. The audiogram shows that his hearing loss is confined to high tones. He had served in World War I in both the infantry and the artillery.

Figure 5 is the record of a young woman who had been a telephone operator for ten years. She heard ordinary conversation without difficulty. Recently her supervisor had received complaints that she was giving her patrons the wrong numbers. She wore the receiver at her right ear because the left was slightly defective from otitis media, which occurred early in life. In this case the loss was a serious handicap. Since she could no longer perform her work satisfactorily she was

Information Obtained from Audiograms

Dry Cotton Packs

Pitch	32	64	128	256	512	1024	2048	2896	4096	5793	8192
R. N. Rt. ear	20	20	25	20	25	10	25	45	30	40	25
R. N. Lt. ear	5	5	10	20	5	15	30	40	15	40	45
E. F. Rt. ear	0	5	0	0	5	10	30	15	0	15	30
E. F. Lt. ear	0	5	0	0	10	10	25	10	20	10	25
Total.....	25	35	35	40	45	45	110	110	65	105	125
Average....	6¼	8¾	8¾	10	11¼	11¼	27½	27½	18¼	21¼	38¾

Cotton-Petrolatum Packs

Pitch	32	64	128	256	512	1024	2048	2896	4096	5793	8192
R. N. Rt. ear	25	25	30	25	35	30	40	40	30	35	25
R. N. Lt. ear	45	40	45	50	45	40	45	40	20	45	45
E. F. Rt. ear	25	30	25	20	25	25	25	30	5	25	35
E. F. Lt. ear	20	20	15	20	35	35	35	35	30	25	35
Total.....	115	115	115	115	140	130	145	145	85	130	140
Average....	28¾	28¾	28¾	28¾	35	32½	36¼	36¼	21¼	32½	35

placed on furlough, and her discharge was being considered. She attributed her hearing loss to the extremely loud noises carried to her ear by the telephone.

Further examination of the physical factors which are involved has been made possible by the development of the noise level meter. Commissions in several cities have used these instruments successfully in noise abatement campaigns. Figure 6 (copied with permission of the editors of *Electronics*) is a diagram showing the amount of noise found in various conditions measured by a noise level meter. This shows that boiler makers are subjected to about 90 decibels of noise. It is known that boiler making produces hearing losses. It is known also that, if heavy street traffic at a noise level of 80 decibels produced hearing losses, most of our city dwellers would be hard of hearing. The boundary line between noises which cause hearing losses and those which do not lies between 80 and 90 decibels. All that is necessary to prevent hearing losses from noises at a level of 90 decibels is to insulate the acoustic apparatus or deaden the sound at its source by approximately 10 decibels.

Figure 7 shows the audiograms of two young men whose hearing in the sound proof room (with a 1A Western Electric audiometer) is indicated by the records in connected circles. The external canals were blocked with dry cotton packs and the tests repeated. The records for the second condition are given in crosses. The dry cotton plugs caused very little lowering of the thresholds for low tones but in each case blocked out the high tones much more effectively. If the noise under suspicion is made up of low frequencies, dry cotton packs will give only 5 or 10 decibels protection. The records of connected dots were made similarly except that the canals were closed with petrolatum saturated cotton packs.

The data from these audiograms are arranged in the table. The average loss produced by dry cotton packs for tones below 512 double vibrations was 10 decibels or less. The thresholds for higher frequencies were lowered from 11 to 38 decibels. The petrolatum-cotton packs made an obstruction for both low and high tones consistently greater than that secured with dry cotton packs.

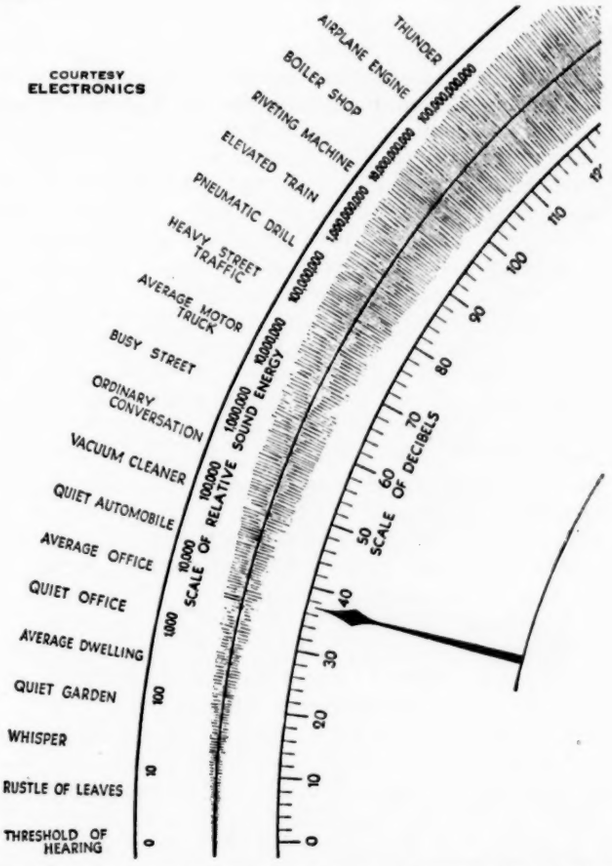


Fig. 6.—Scale of a noise level meter showing the amount of noise under various conditions.

These four records are perhaps an insufficient number from which to compute averages. They show considerable variation. E. F. blocked his right ear much more effectively than his left. This should be a warning in

industrial work where adequate protection of this kind is desired. Instructions to workmen requesting them to pack their ears may not give the desired result. These two men packed their ears as well as they could. They were interested in the experiment and were intelligent listeners. If adequate maximum protection is desired routinely, some more efficient type of protective device should be available.

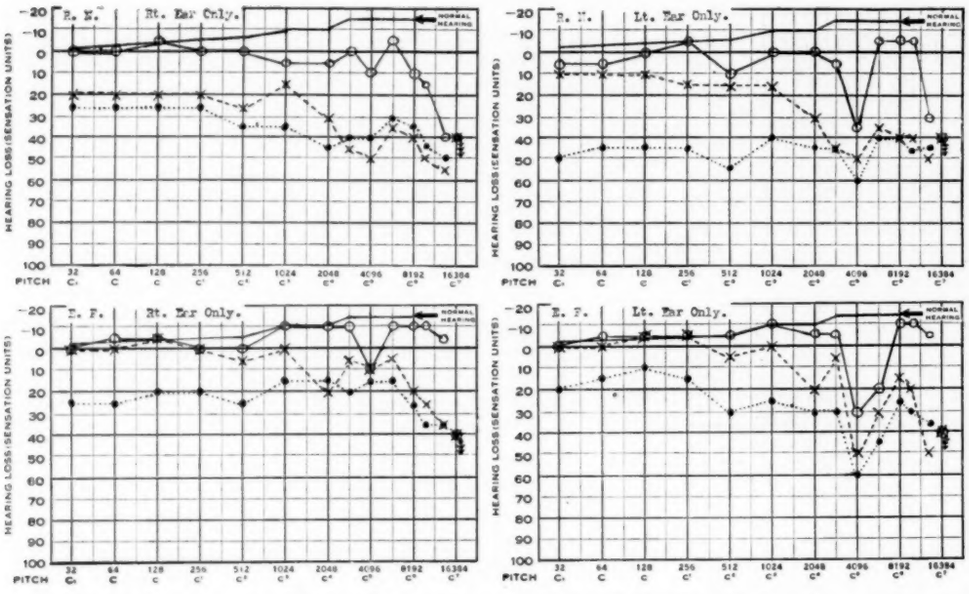


Fig. 7.—Audiograms of the right and left ears of two graduate students, first with the external canals open (records of circles), then with the canals closed with dry cotton packs (records of crosses) and finally with the canals closed with petrolatum saturated cotton packs (records of heavy dots).

If the noise of an airplane motor is at a level of 110 decibels, as shown in figure 6, blocking out 20 decibels of this noise with dry cotton packs would leave a level of 90 decibels, that of the noise in a boiler shop. Petrolatum-cotton plugs would, if properly inserted, lower the noise level to a point which is theoretically no longer potentially dangerous to hearing.

Perlman [10] reported from experiments on human listeners that "sounds of low frequency produced less acoustic trauma than those of high frequency." The tonal spectrum of the noise of an airplane is not available for analysis here. It is probably made up of tones having a wide range of frequencies. If the high component tones of this noise come at a level of 110 decibels the petrolatum-cotton plugs, which, according to the table, obstruct tones above 512 double vibrations by 30 to 35 decibels, should prove effective in lowering the level of these high tones to a point which is no longer harmful to the perceptive mechanism. While the effectiveness of the blocking by petrolatum-cotton packs is less for low than for high tones, packs may be effective in preventing deafness, for, according to Perlman, low tones have less traumatic effect than high.

It is mandatory in certain cities that policemen shall be efficient in the use of side arms. A minimum of practice and frequent tests in a shooting gallery are prescribed for efficiency ratings. Some of these marksmen have found that the noise of firearms in shooting galleries is unpleasant or painful to the ears and have learned to minimize these effects by plugging their ears with empty cartridges. Figure 8 shows the audiograms of two policemen with definite hearing losses which may have resulted from pistol fire. The first one reported that at his last gallery practice the effects of each shot were as if a sharp instrument were being stuck in his ears. He used no protective device. The second was a police chauffeur who was a "crack" shot and a member of the police pistol team. It is significant that he was right handed and that the right ear has the greater hearing loss. The audiograms of both men show relatively good hearing for low tones with the sudden sharp drop in acuity for high tones which has consistently been found in cases of traumatic deafness.

Hard, smooth walls, ceilings and floors make excellent sound reflectors. Shooting galleries should be set up in open spaces where nothing can prevent the rapid dissipation of the acoustic energy of the explosions. If conditions make this impossible, the walls, ceilings and floors of the gallery should be adequately treated with sound absorbing materials to minimize reflection and keep the reverberation time as low as possible. Figure 9 shows a shooting gallery with walls and ceilings treated in this manner. This picture appeared in a cosmopolitan daily, so it is evident that in some cities steps are being taken to conserve the hearing of policemen while they are at target practice. No enclosed shooting gallery without adequate acoustic treatment should be licensed in any city.

No thought is given to reverberation of sound in caissons. Walls of steel, concrete and stone make excellent reflectors. The noises of blasting and compressed air machinery under these conditions are, theoretically at least, a terrific hazard to hearing, not only because of reverberations, but because of the change of the speed of sound in air at increased pressure. Caisson

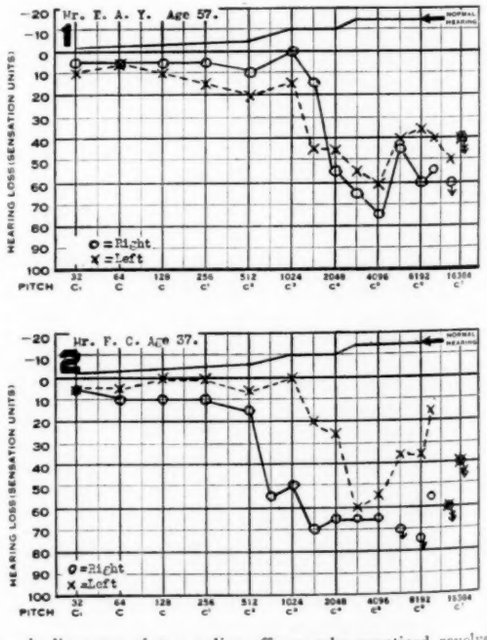


Fig. 8.—Audiograms of two police officers who practiced revolver shooting in a station target gallery.

workers are therefore subjected to two hazards, either of which may adversely affect hearing.

Industries in peace and in war differ chiefly in the intensity and direction of effort. In war the hazards to hearing are intensified if for no other reason than the increase in personnel. In figure 10, 1 is the audio-

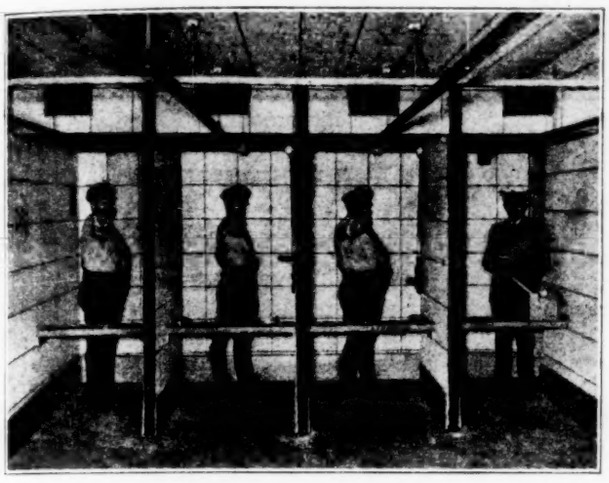


Fig. 9.—Newspaper illustration showing policemen at target practice in a gallery with acoustically treated walls and ceilings.

gram of a young farmer who drove his tractor, which he described as a "noisy old Case," all day long during the plowing and threshing seasons. This record is similar to 2, the audiogram of a World War I whippet tank driver and machine gunner. The latter stated that, when the tank was moving, conversation between the driver and the observer, who stood directly behind him, was impossible because of the terrible din. This was accentuated when the machine gun was fired. The increased mechanization of our modern armies and increased firing power of modern armament will result in greater acoustic trauma in 1942 than in 1918.

The sacrifice of the hearing of those in the battle front will be a small price to pay for the preservation of our democracy, but it is too great a price to pay if, through ignorance and indifference, protective methods are not used whenever and wherever necessary. Dr. J. B. Costen,[12] who was attached to a medical unit in France during World War I, reported that on the day following an intense barrage a large number of soldiers reported at the hospital with their external auditory canals filled with dirt. On inquiry he was told that when a barrage started these men pressed handfuls of mud into their ears: a fairly efficient, if not entirely sanitary, method of protection. In the summer of 1940, during the intense bombing of London, the government issued ear plugs to the metropolitan population in order, it was stated, to prevent rupture of the drum membranes and to shut out the noise of explosions and make necessary sleep possible. Doubtless these ear plugs were more or less effective in preventing hearing losses.

The action of our universal compulsory education laws are such that industry must recruit workmen from those who attend our public and private schools. School administrators in many states have learned that hearing tests aid in adjusting the child's educational program, and some states require that all children in the public schools shall be tested each year. Results show that from 5 to 7 per cent of the school children have measurable hearing defects. Some but not all of these receive treatment which alleviates the condition. Others go into industry with definite hearing losses which may or may not become progressive. It is only fair to both employee and employer to know of hearing losses which exist at the beginning of employment. Such tests would protect both, and conditions which are harmful could be determined by repeated tests and suitable protective devices installed. For the employer, the tests would provide adequate insurance against employees who claim damages for losses which existed prior to the time of employment. In addition, such tests conducted over a long period of time would reveal much scientific information concerning otologic problems.

The question of conservation of hearing leads directly to that of compensation for losses acquired in industry. Politzer's statement that these cases cannot be judged from a medicolegal standpoint can scarcely be true today if, as is now believed by some, these acquired losses can be identified. Cases of this kind do appear before courts, and compensation boards are making awards for hearing losses. The amount of the award often appears to depend not on the amount of damage to hearing but on the relative technical skills of the legal representatives of the interested parties. A glance through the decisions from different states shows a lack of uniformity. Only a few states have adopted definite schedules. Insurance companies have worked out no general schedule of awards for acquired hearing defects comparable with that used for acquired visual defects. A committee of the Council on Physical Therapy of the American Medical Association is working on this problem at the present time. Fowler,[13] a member of this committee, and Sabine,[14] another member, have presented studies which

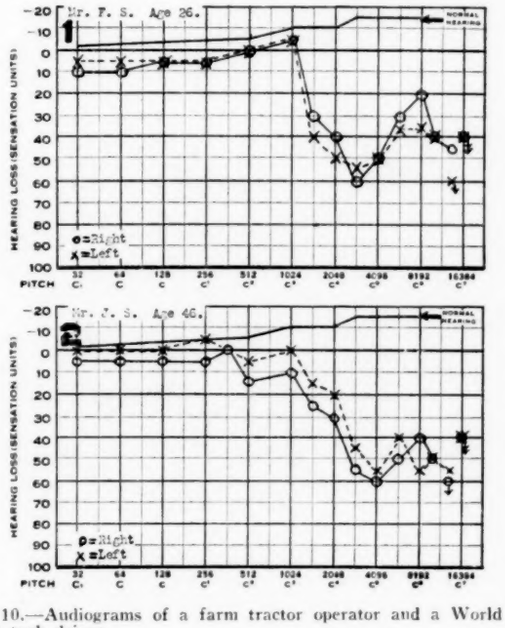


Fig. 10.—Audiograms of a farm tractor operator and a World War I whippet tank driver.

show that the problem is being considered in a practical as well as a scientific manner. In the near future a uniform scale based on these or other studies may possibly be universally adopted.

12. Costen, J. B.: Personal communication to the author.

13. Fowler, E. P.: Tests for Hearing, chapter X, p. 420, of Nelson's Loose Leaf Medicine of the Ear. 1939.

14. Sabine, P. E.: Tr. Am. Acad. Ophth. & Otol. 1941, to be published.

FAILURE OF AMINOACETIC ACID TO INCREASE THE WORK CAPACITY OF HUMAN SUBJECTS

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During the past decade aminoacetic acid has been used in the treatment of various myopathies and currently is the subject of debate relative to its value in the treatment of fatigue and in increasing endurance. Aminoacetic acid is also known as glycine and glycocoll. It is present in most of the common proteins, and by chemical analyses [1] one fourth of the protein, gelatin, has been shown to be aminoacetic acid.

From 1927 to 1929 Brand, Harris, Sandberg and Ringer [2] in their search for the precursor of creatine first gave aminoacetic acid to patients with progressive muscular dystrophy. Thomas, Milhorat and Techner [3] in 1932 reported clinical improvement in certain patients with this disease after prolonged treatment with this amino acid. Brand and his co-workers [4] in their original work, and later in 1933, and Boothby [5] in 1934 failed to find such beneficial effect in patients with progressive muscular dystrophy when similarly treated. Boothby [6] from 1932 to 1936 made an extensive study of myasthenia gravis and reported 50 per cent of his patients recovered sufficiently after treatment with aminoacetic acid to allow them to return to full or half time work. As a result of his observations, Boothby and other members of the Mayo Clinic [5] considered the possibility of aminoacetic acid being of value in the treatment of simple fatigue. Wilder,[7] in the ensuing discussion, warned that the sense of fatigue is more readily influenced by suggestion than is any other malaise and, therefore, objective data and well controlled experiments were most important in a study on this subject. Subsequently he and his co-workers [8] carried out a prolonged and controlled experiment and concluded that "the results of this experiment were not such as to encourage belief either that glycine appreciably affects the well-being of normal, healthy men or women of this age group, or significantly delays or mitigates the normal sense of fatigue."

There was little enthusiasm for the use of aminoacetic acid as a treatment for fatigue until 1939 when Ray, Johnson and Taylor [9] reported significant increase in the work output in men, but not in women, following the ingestion of gelatin. In 1940 and 1941 Kaczmarek [10] reported large increases in work output, especially in women, following the use of gelatin. In 1941 Chaikelis [11] stated that he had observed increases in strength following the use of aminoacetic acid.

In none of these favorable reports was there an adequate series of observations or controls.

Other students of the problem of fatigue have not found either gelatin or aminoacetic acid effective in reducing fatigue by increasing endurance. Dill and his co-workers [12] in an extensive study on students, using the grade walk, commonly known as the treadmill, as the method for measuring work output, found that gelatin did not produce considerable effects on the mechanical efficiency, the capacity for severe work of short duration, the limiting capacity for supplying oxygen to tissues or the level of lactic acid attained in maximal work. Likewise, Robinson and Harmon [13] in similar studies on healthy male subjects found negative results following the administration of gelatin.

Hellebrandt, Rork and Brogdon [14] studied the effect of gelatin on young women at the University of Wisconsin and arrived at the conclusion that gelatin has no effect on the capacity of women to perform maximal anaerobic work or any apparent effect on the rate of improvement due to training. These investigators compared the data of Ray and others with their own and suggested that the increase in work output attributed by Ray to gelatin may have been an effect of training.

Maison [15] in a study on thoroughly trained and also untrained persons reported that neither gelatin nor aminoacetic acid increased the work ability of the extensor digitorum communis muscles working with or without blood supply.

Knowlton [16] did not observe any difference in the performance of the isolated gastrocnemius muscle removed from rats fed gelatin and that from control rats not receiving gelatin.

From the Food and Drug Administration, Federal Security Agency, Washington, D. C.

This investigation was conducted by the Federal Food and Drug Administration at the District of Columbia Reformatory at Lorton, Va., through the courtesy of Robert E. Bondy, director of public welfare for the District of Columbia, Ray L. Huff, superintendent of penal institutions, and E. J. Welch, deputy superintendent of the District of Columbia Reformatory. Dr. Frank R. Klune and other officials of the institution assisted the authors with the experiment.

1. Analyses by the Food and Drug Administration of six different makes of gelatin obtained from the open market revealed from 24.8 to 25.6 per cent of aminoacetic acid.

2. Brand, Erwin; Harris, M. M.; Sandberg, M., and Ringer, A. I.: Studies on the Origin of Creatine, Am. J. Physiol. **90:** 296-297 (Oct.) 1929.

3. Thomas, Karl; Milhorat, A. T., and Techner, Fritz: Untersuchungen über die Herkunft des Kreatins: Ein Beitrag zur Behandlung progessiver Muskelatrophien mit Glykokoll (Vorläufige Mitteilung), Ztschr. f. physiol. Chem. **205:** 93-98, 1932. Milhorat, A. T.: Ueber die Behandlung der progressiven Muskeldystrophie und ähnlicher Muskelerkrankungen mit Glycokoll, Deutsches Arch. f. klin. Med. **174:** 487-517 (Jan. 12) 1933.

4. Harris, M. M., and Brand, Erwin: Metabolic and Therapeutic Studies in the Myopathies with Special Reference to Glycine Administration, J. A. M. A. **101:** 1047-1052 (Sept. 30) 1933. Brand, Harris, Sandberg and Ringer.[2]

5. Boothby, W. M.: The Clinical Effect of Glycine in Progressive Muscular Dystrophy, in Simple Fatigability and on Normal Controls, Proc. Staff. Meet., Mayo Clin. **9:** 600-603 (Oct. 3) 1934.

6. Boothby, W. M.: Myasthenia Gravis: Preliminary Report on the Effect of Treatment with Glycine, Proc. Staff Meet., Mayo Clin. **7:** 557-562 (Sept. 28) 1932. Boothby, W. M.; Adams, Mildred; Power, M. H.; Edgeworth, Harriet; Moersch, F. P.; Woltman, H. W., and Wilder, R. M.: Myasthenia Gravis: Second Report on the Effect of Treatment with Glycine, ibid. **7:** 737-756 (Dec. 28) 1932. Boothby, W. M.: Myasthenia Gravis: The Effect of Treatment with Glycine and Ephedrine: Third Report, Arch. Int. Med. **53:** 39-45 (Jan.) 1934; Myasthenia Gravis; Effect of Treatment with Glycine and Ephedrine: Fifth Report, Proc. Staff Meet., Mayo Clin. **9:** 593-597 (Oct. 3) 1934; Myasthenia Gravis: Sixth Report, Ann. Int. Med. **9:** 143-149 (Aug.) 1935; Myasthenia Gravis: Seventh Report, Medical Papers Dedicated to Dr. Henry A. Christian, February 1936, pp. 883-893; Myasthenia Gravis: Eighth Report, Tr. A. Am. Physicians **51:** 188-198, 1936.

7. Wilder, R. M.: A Consideration of Muscular Pain and Fatigue with a Note on Glycine: General Discussion, Proc. Staff Meet., Mayo Clin. **9:** 606-608 (Oct. 3) 1934.

8. Wilder, R. M.: A letter to Dr. Harold Aaron, Consumer Union Reports, June 1939, p. 19.

9. Ray, G. B.; Johnson, J. R., and Taylor, M. M.: Effect of Gelatin on Muscular Fatigue, Proc. Soc. Exper. Biol. & Med. **40:** 157-161 (Feb.) 1939.

10. Kaczmarek, R. M.: Effect of Gelatin on the Work Output of Male Athletes and Non-Athletes and Girl Subjects, Research Quarterly **11:** 4-109, 1940; Relative Influence of Exercise, Gelatin and Sham Feeding on Work Output, Heart and Pulse Rates, M. Rec. **153:** 383-391 (June 4) 1941.

11. Chaikelis, A. S.: The Effect of Glycocoll (Glycine) Ingestion upon the Growth, Strength, and Creatinine-Creatine Excretion in Man, Am. J. Physiol. **132:** 578-587 (April) 1941.

12. Dill, D. B.; Knehr, C. A.; Robinson, S., and Neufeld, W.: Gelatin and Muscular Fatigue, personal communication to the authors.

13. Robinson, S., and Harmon, P. M.: The Effects of Training and of Gelatin upon Certain Factors Which Limit Muscular Work, Am. J. Physiol. **135:** 161-169 (May) 1941.

14. Hellebrandt, F. A.; Rork, Rozell, and Brogdon, Elizabeth: Effect of Gelatin on Power of Women to Perform Maximal Anaerobic Work, Proc. Soc. Exper. Biol. & Med. **43:** 629-634 (April) 1940.

15. Maison, G. L.: Failure of Gelatin or Aminoacetic Acid to Increase the Work Ability of Individual Normal Human Muscles, J. A. M. A. **115:** 1439-1441 (Oct. 26) 1940.

16. Knowlton, G. C.: Effect of Gelatin Feeding upon the Strength and Fatigability of Rats' Skeletal Muscle, Am. J. Physiol. **131:** 426-427 (Dec.) 1940.

Karpovich and Pestrecov [17] in well controlled studies using different methods and types of subjects observed no effect on muscular performance from the feeding of gelatin over that found in controls receiving sham feedings of a nongelatin substitute.

PROCEDURE AND METHODS

The purpose of the investigation was to determine the effect of aminoacetic acid on the work capacity of human beings.[18]

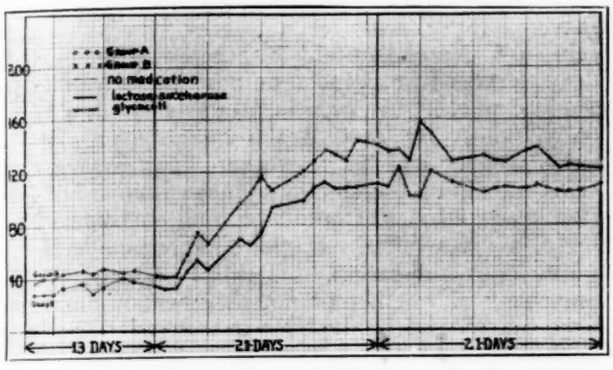

Chart 1.—Study on work capacity of groups A and B. The figures in the ordinate represent total kilowatt seconds.

In order to eliminate as far as possible the subjective element, and at the same time to control the study as thoroughly as possible, the experiment was conducted in the following manner: Two sets of tablets similar in appearance, shape, form and taste were specially prepared for us by a pharmaceutical house. The investigators associated with the experiment knew only that one of these sets of tablets contained aminoacetic acid while the other set was a mixture of lactose and saccharose. The identity of the tablets was not revealed until the experiment had been completed, the final calculations made and conclusions drawn.

The voluntary subjects for the experiment were members of two football teams, all of whom, prior to the experiment, were given physical examinations and found to be physically fit to perform arduous exercise. It was explained that we were seeking to determine whether or not tablets containing gelatin were of value in preventing fatigue or increasing work capacity. They were led to believe that all the tablets contained gelatin. This was purposely done in order to determine what effect, if any, could be attributed to suggestion alone, under carefully controlled conditions. These men were familiar with advertisements in which claims had been made that gelatin was being used in the training of various prominent football teams and was of value in increasing endurance and relieving fatigue. Because of these claims, members of both football teams were enthusiastic about trying the experiment on themselves. A total of 36 men volunteered, and of these 33 completed the experiment. All the subjects were institutionalized, lived in dormitories, ate the same food, had the same recreational facilities and confinement and were subject to the same hours of sleep and work.

The instrument used to measure the work output was a bicycle ergometer.[19] This bicycle ergometer was reconstructed so that the work output was generated into electrical energy, and from the ampere and voltmeter readings the watt output per second was calculated. The mechanical efficiency of the machine was not determined. The rate of work output was maintained at approximately 144 watts per second, a rate which on this machine as a whole could not usually be maintained by a subject at the peak of performance longer than two or three minutes, although there were exceptional men who maintained this rate for five minutes. The exact watt output per second for each individual and the length of time he was able to maintain this rate of work was recorded for each subject daily with the exception of Sundays, holidays and other rare occasions.

Following a thirteen day training period, during which the subjects rode the bicycle without medication, data were recorded on the work capacity of each subject. On the basis of these observations the representatives of the Blue Football Team, who were of the Caucasian race, were divided into groups A and B, and those of the Brown Football Team, who were of the Negro race, into groups C and D. The men were distributed so that subjects with different capacities for work were present in all groups.

At the completion of the experiment the distribution of the 33 members completing the experiment was as follows:

Group A, 6 members of the Blue Football Team.
Group B, 8 members of the Blue Football Team.
Group C, 9 members of the Brown Football Team.
Group D, 10 members of the Brown Football Team.

Immediately following the preliminary study or training period groups A and C were given tablets identified as number 158 containing no aminoacetic acid and groups B and D, tablets identified as number 365 containing 7½ grains (0.5 Gm.) each of aminoacetic acid. The tablets [20] were given at a dosage of three tablets four times a day, with the exception of Sundays and holidays, on which days three tablets three times a day

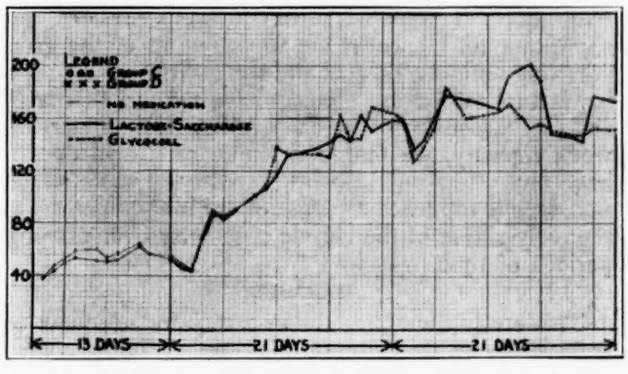

Chart 2.—Study on work capacity of groups C and D. The figures in the ordinate represent total kilowatt seconds.

were given. The subjects therefore received, depending on the identity of the tablets, which was not known to the experimenters or the subjects, either a dose of

17. Karpovich, P. V., and Pestrecov, K.: Effect of Gelatin upon Muscular Work in Man, Am. J. Physiol. **134:** 300-309 (Sept.) 1941.

18. The Food and Drug Administration during the past year has brought action against both gelatin and aminoacetic acid preparations the labeling of which made claims for their value in relieving fatigue and increasing endurance on the charges that these claims were false and misleading in the following notices of judgment under the Federal Food, Drug, and Cosmetic Act: Misbranding of Myasthene Tablets, number 100; Misbranding of Myasthene Tablets, to be published; Misbranding of Knox Gelatine, to be published.

19. The bicycle ergometer originally used by Atwater and Benedict was remodeled and employed in this experiment. Atwater, W. O., and Benedict, F. G.: Experiments on the Metabolism of Matter and Energy in the Human Body, U. S. Department of Agriculture, Office of Experiment Stations, bulletin 69, 1899; Experiments on the Metabolism and Energy in the Human Body, U. S. Department of Agriculture, Office of Experiment Stations, bulletin 109, 1902.

20. For investigating claims of certain manufacturers, a commercial aminoacetic acid preparation purchased on the open market was used according to directions on the labeling.

approximately 6 Gm. of aminoacetic acid daily except Sundays and holidays, when the amount ingested was approximately 4.5 Gm., or the control equivalent in lactose-saccharose.

After three weeks the tablets were reversed, so that groups A and C, who originally received the placebo, now received tablets of aminoacetic acid, while groups B and D, who had received the medication, now were given the placebo. There was no lapse in the experiment at the time of change of tablets and the subjects were not informed that there was any such change. The study was controlled as completely as possible with groups A and B serving as controls for each other with both sets of tablets, and groups C and D likewise being controlled. The individual subjects were in addition cross controlled, since they received both aminoacetic acid and lactose-saccharose tablets.

RESULTS OF THE EXPERIMENT

The results of the experiment are revealed in charts 1 and 2. A plateau was developed in the daily work output during the first thirteen days when no medication was given. During the next twenty-one days lactose-saccharose tablets were given to groups A and C and aminoacetic acid tablets to groups B and D. During the last twenty-one days these tablets were reversed.

A rapid and progressive increase in work output was observed for all groups during the period of study, regardless of the medication given, which is revealed in charts 1 and 2. The peaks of work output came for group A at the twenty-third day of medication at 208 per cent increase over the maximum attained during the training period, group B reached a 235 per cent increase on the twenty-fifth day of medication, group C attained 198 per cent increase by the twenty-sixth day while group D had an increase of 213 per cent on the thirty-fourth day of medication.

From charts 1 and 2 we find a strong similarity between the curves of all groups. In fact, the difference is less between curves of two groups receiving different medications, such as A compared with B, and C compared with D, than it is between the curves of groups A and C, and B and D, who received the same treatment but were of different races. There is no significant difference in the work output of the groups receiving aminoacetic acid and the control groups receiving lactose-saccharose. Recognizing the fact that lactose and saccharose do not have a specific effect on increasing work capacity, we find that aminoacetic acid does not have any effect on the work capacity of male subjects nor does it influence the rate of training which follows the daily riding of the bicycle ergometer over prolonged periods of time.

COMMENT

This study illustrates the necessity for adequate controls for an investigation of this type. Without controls, erroneous conclusions would have been drawn from the results we obtained during the first twenty-one day period for both aminoacetic acid and lactose-saccharose. It is interesting to note that the work capacity of all subjects invariably increased when they received tablets with the suggestion that they would counteract fatigue. Twenty-four subjects reported a subjective feeling of benefit with both the aminoacetic and the lactose-saccharose tablets, 4 reported no subjective benefit from either aminoacetic acid or lactose-saccharose, 2 reported subjective improvement only from the lactose-saccharose tablets and 3 reported improvement with aminoacetic acid. The members of groups C and D, of the Negro race, were especially receptive to suggestion and felt that the tablets, regardless of whether they contained sugar or aminoacetic acid, were helping them, while members of groups A and B, who were Caucasian, were more dubious of their value.

In considering the claims which have been made for aminoacetic acid and gelatin, it should be pointed out that the food of the ordinary diet more than amply supplies the requirements of the body for these substances. Aminoacetic acid is not an essential substance for growth and nutrition. This has been proved by Rose [21] in his nutrition experiments on animals in which this amino acid was found entirely dispensable. Quick [22] has demonstrated that aminoacetic acid can be readily synthesized in the body by man at a rate of 13 to 17 Gm. daily, which far exceeds the ordinary requirements. Schoenheimer and his co-workers [23] by feeding amino acids containing the labeled nitrogen isotope N^{15} found that it was liberated from its original amino acid by the body and resynthesized into other amino acids and nitrogenous substances. Thus all ingested proteins, regardless of whether or not they contain aminoacetic acid, can be used by the body to synthesize aminoacetic acid in abundance.

The milk diet of the newborn and the casein diet used in the feeding of laboratory animals are both notably capable of maintaining growth, nutrition and health. Both diets are low in aminoacetic acid content and are indicative of the unessential characteristics of aminoacetic acid and gelatin.

Ray [9] suggested that his observations of increased work output may be due to the creatinogenic effect of aminoacetic acid. Beard and Pizzolato [24] reported that the injection of various amino acids into rats resulted in an increase in the muscle creatine. These results have not been confirmed by other investigators,[25] and Bloch and Schoenheimer [26] in recalculating the data of Beard and Pizzolato found that on the basis of their observations most of their compounds would have had to yield more than 100 per cent of their nitrogen in order to form the increased amount of muscle creatine claimed. It is generally accepted [27] that the creatine content of muscle for a specie of animal is remarkably constant regardless of the food ingested.

Bloch and Schoenheimer [26] have now definitely established that aminoacetic acid, methionine and arginine together enter into the formation of creatine. These investigators [28] have further demonstrated that in the rat, an animal which has a protein metabolism remarkably similar to that of man, creatine is synthesized daily in amounts corresponding to about 2 per cent of the total creatine of animal tissues, and this is about the

21. Rose, W. C.: Nutritive Significance of the Amino Acids, Physiol. Rev. **18:** 109-136 (Jan.) 1938.

22. Quick, A. J.: The Conjugation of Benzoic Acid in Man, J. Biol. Chem. **92:** 65-85 (June) 1931.

23. Schoenheimer, Rudolf; Ratner, S., and Rittenberg, D.: Process of Continuous Deamination and Reamination of Amino Acids in Proteins of Normal Animals, Science **89:** 272-273 (March 24) 1939. Weissman, N., and Schoenheimer, Rudolf: Relative Stability of Lysine in Rats Studied with Deuterium and Heavy Nitrogen, J. Biol. Chem. **140:** 779-795 (Sept.) 1941. Rittenberg, D., and Schoenheimer, Rudolph: Studies in Protein Metabolism; Hippuric Acid Formation Studied with Aid of Nitrogen Isotope, ibid. **127:** 329-331 (Jan.) 1939.

24. Beard, H. H., and Pizzolato, P.: J. Biochem. **28:** 421-443 (Nov.) 1938.

25. Fisher, R. B., and Wilhemi, A. E.: Observations on Relation of Urea and Glycine to Creatine Synthesis, J. Biol. Chem. **132:** 135-146 (Jan.) 1940.

26. Bloch, Konrad, and Schoenheimer, Rudolf: The Biological Precursors of Creatine, J. Biol. Chem. **138:** 167-194 (March) 1941.

27. Rose, W. C.: The Metabolism of Creatine and Creatinine, Annual Review of Biochemistry **4:** 258, 1935; personal communication to the authors.

28. Bloch, Konrad; Schoenheimer, Rudolf, and Rittenberg, D.: Rate of Formation and Disappearance of Body Creatine in Normal Animals, J. Biol. Chem. **138:** 155-166 (March) 1941.

same quantity as is daily excreted as creatinine. Since gelatin is an incomplete protein [29] and contains little if any methionine or other sulfur bearing amino acids, it cannot in itself lead to the formation of creatine.

In the currently recognized theories of muscular contraction, the hypothesis that phosphocreatine furnishes chemical energy for muscular contraction has been abandoned. Sacks [30] has shown that vigorous muscular contraction can take place even when the phosphocreatine content of the muscle is extremely low. Furthermore, when phosphocreatine is broken down to its component parts, phosphoric acid and creatine, it is readily resynthesized to phosphocreatine and is not destroyed.

It is evident from recent studies in nutrition that the proteins of the ordinary diet provide a more economical, palatable and satisfactory supply of protein and amino acids than can be obtained by the special use of the incomplete protein gelatin or its unessential principle constituent aminoacetic acid. The metabolism of amino acids is illustrated in chart 3.

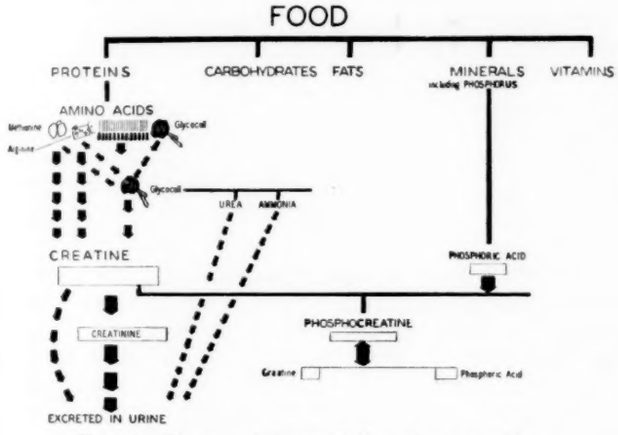

Chart 3.—Diagram of the metabolism of amino acids.

SUMMARY AND CONCLUSIONS

1. Thirty-three male subjects of both the white and the Negro race were given aminoacetic acid in daily amounts of from 4.5 to 6 Gm., under rigidly controlled conditions, over a period of three weeks. There was no effect on the work capacity of these subjects when compared with controls receiving lactose-saccharose under identical conditions or with cross control of the same subjects when receiving lactose-saccharose in the same manner.

2. A review of recent studies in protein metabolism reveals that the claims made for the especial value of aminoacetic acid or gelatin in the treatment of fatigue or increasing endurance are unfounded on theoretical grounds and that the protein of the ordinary diet is fully capable of supplying the aminoacetic acid requirements of man. It is also pointed out that the incomplete protein gelatin is deficient in methionine, one of the amino acids necessary for the synthesis of creatine.

3. It is evident from these experiments that a study of the effects of a drug on fatigue must be meticulously controlled: the drug under study should be administered alternately with a placebo identical in physical characteristics and the identity of each should be unknown to the subjects as well as to the investigators.

29. Schmidt, C. L. A.: The Chemistry of the Amino Acids and Proteins, Springfield, Ill., Charles C. Thomas, 1938, p. 217.
30. Sacks, J.: Changing Concepts of the Chemistry of Muscular Chemistry, personal communication to the authors.

RECENT TRENDS IN PHYSICAL EXAMINATION UNDER CIVIL SERVICE

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With reference to the number of employees on the roll, and the number of occupations represented, the federal government is the nation's leading employer. The number of different kinds of positions is in the thousands; and, as to duties, they range from sedentary work such as that of a typist, in which it is possible to set a physical standard so liberal that many handicapped persons can be admitted to the competition, to positions of immigration patrol inspector or of policeman, in which the duties demand as nearly perfect a physical specimen as it is possible to secure, young, robust and able to endure hardship and prolonged exertion.

The Civil Service Act when passed in 1883 covered only 13,780 positions. These were practically all of the clerical or office types of employment. At that time there were no general laws providing for compensation for persons injured as a result of employment, the only relief possible in such cases being through an act of Congress, a procedure often unsuccessful and, when successful, a process sometimes involving years and attorney fees. General laws did not come until 1916.

There was in 1883 no provision for the retirement on annuity of aged or infirm employees, the choice between retaining them while able to perform only partial or no service or removing them without means to live on being determined by the social conscience of the head of the bureau or the department.

For these reasons ability to perform duty and the danger to fellow workers from communicable disease were the only questions to be considered and little systematic consideration was given these, the Civil Service Commission having a very small force on its payroll, about fifteen in all, and being overloaded with other duties.

For one organization, however, the Railway Mail Service, beginning with its classification in 1889, because of the severe and exacting character of the work required and the great strain on the physical constitution and powers of endurance, a physical examination was required as a condition precedent to appointment.

In 1896 an order of President Cleveland brought in, among other positions, a number of mechanics and handicraftsmen, raising the total of classified positions to 87,044. In connection with these trades positions, physical qualifications were introduced as a ratable element of the examination. The medical certificate was sometimes executed by a federal doctor but usually by the applicant's own physician. In 1903 Congress appropriated for the first full time doctor on the commission's rolls—a doctor who had been employed in industrial medicine by the Roebling plant in New Jersey. A large proportion of his time was employed in rating the written examination papers of applicants for physicians, dentists, veterinarians, nurses and other medical and related fields. Attention was given, however, to the types of physical ability desirable for trades positions.

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

In 1916 a general employees' compensation law was passed and the Employees' Compensation Commission created. It had hardly begun to function before the World War with its demand for man power in navy yards, arsenals and other branches of the government service resulted in little attention being paid to the physical qualifications of persons who had the necessary skill to perform duty in the emergency. The number of positions in the competitive classified service in the year prior to the war was 297,000; this total jumped to over 642,000 in the year 1918. It must be remembered that turnover was heavy and that this number represents only the employees under the competitive system administered by the Civil Service Commission, the total number of federal employees being much larger. As a result of the necessary employment of persons who were below a desirable physical standard of health the World War was followed by a great number of claims under the Employees' Compensation Act.

In 1920, acts for the retirement on annuity of civilian employees were passed, covering both retirement for age and retirement for disability before the normal age limit is reached.

The great bulk of claims for disability for injury due to employment naturally centered in the navy yards and the arsenals, the federal manufacturing establishments. As a result the War and the Navy departments in 1921 established the requirement that all persons entering the employment of the navy yards and the arsenals would be given an examination by a member of the Army or the Navy Medical Corps to determine their physical condition and fitness for duty.

This procedure was extended by the Civil Service Commission in 1923, under an order of the President of the United States, to all competitive positions; that is, a physical examination by a federal medical officer was made a part of the appointment routine for each competitive position. The order of the President provided the necessary authority for the commission to call on federal medical personnel to make the examinations. On June 30, 1941 the total number of competitive classified positions was 1,358,150.

PHYSICAL FITNESS

The preceding remarks give a background for the reasons for the present elements considered in passing on the physical fitness of an applicant for employment in the classified civil service. These are:

1. Is the applicant physically capable, on the entrance date, of performing the duties of the position?
2. Is the physical stamina of the applicant such that he will not be a compensation hazard, and is it such that he will not constitute an accident risk to himself or to his fellow workers or others?
3. Is the health of the applicant at the present time such that he will not constitute a retirement hazard?

Each of these elements requires a careful job analysis of the duties of each of the thousands of different employments, both as to the effect of physical defects on the ability to perform efficient duty until the normal retirement age is reached and as to the relation of such defects to employment hazards to the worker or others. The results of studies of the statistics of employees' compensation claims, and of the causes of premature retirements for disability, must be combined with job analysis studies to arrive at a decision which will be of value in drafting physical requirements. The actual analysis of the job must be thorough and should be made on the job, especially for trades positions.

Within the past year the commission has established a medical division, headed by a medical director, to deal with matters which involve medical science in the field of civil service employment. The duties of the position of head of the division are, in part:

To be responsible for all steps taken by the commission to control physical standards and regulations for federal government employees and candidates for such employment, including reviewing, revising and establishing medical procedures, regulations and rules governing standards of physical fitness to be set and enforced in recruiting for government employment; also the directing of the planning and conduct of examinations for positions in the government service in medical and related fields.

The incumbent acts as medical adviser to the commission, interpreting the medical problems in programs concerning recruiting, employment or retirement. He also cooperates with officials of other government agencies, particularly the United States Public Health Service, the Veterans' Administration, the War and Navy departments and other agencies employing medical staffs, in developing employment programs and policies. The incumbent also keeps in close touch with medical schools and hospitals and with professional medical and other organizations in order to maintain the best recruiting standards and also to develop types of training calculated to serve better the needs of the government.

This division has been organized and, in addition to the director, includes a force of physicians at Washington, D. C., and the necessary supporting personnel. Under his direction there is also a medical officer in the headquarters office of each of the thirteen civil service districts.

The program for establishing standards of physical fitness includes a study of the duties of each type of position, not only those in federal employment but also in large private industrial organizations. These studies are made either from the central office at Washington or by the associate medical officer at the district headquarters. This has been done so far by the central office for over five hundred different positions. Once the duties of a job are broken down into the actual processes involved, the applying of the appropriate physical requirements to insure efficient physical ability to produce while avoiding undue employment and retirement hazard is much simplified. The five hundred different employments cover many thousands of different employees and have been classified under fifteen different standard formulas ranging from the liberal standard possible for desk duty where the physical labor involved is light to the most exacting with respect to physical and nervous strain.

APPLICATION OF STANDARDS

It may here be desirable to mention briefly the mechanics of applying these standards. The employing officer calls on the commission for the names of persons qualified to perform certain duties. An announcement for a competitive examination is prepared and this includes a "physical ability" requirement. The medical division consults with the person or persons in the department on the duties to be performed. If these clearly fall under one of the standard formulas, the appropriate formula is included in the announcement. If not, a special formula is devised. Thus the public

is informed of the degree of physical fitness demanded for appointment. Persons with remediable diseases or defects may make application and have the defect corrected while the examination process is progressing, and, therefore, if they pass the other elements of the examination they may be acceptable for appointment by the time the papers are rated. If the correction cannot be made by that time, correction at any time during the life of the eligible register will entitle the applicant to full eligibility.

At the time of appointment a medical certificate is required to supply a record of the appointee's physical status when the government assumes responsibility under employees' compensation and disability retirement statutes.

In normal times this certificate must be executed by a doctor of medicine employed by the federal government. During the present war emergency, because of the unusual amount of work imposed on these government officers, the certificate of any duly licensed doctor of medicine is being accepted.

In cases known as noncompetitive, for example, in which a person who has had previous service and has been separated from a department is nominated for reinstatement, a more liberal standard than the competitive one is adopted. The previously acquired training or experience being taken into consideration, in view of the greater value to the service of the former employee as compared with a new one, the inquiry is usually confined to ability to perform duties satisfactorily without danger to the person himself or to others.

An important phase of the work of the medical division is the study of the extent to which persons with physical handicaps may be given employment. Study is required to determine the degree of defective physical condition which will meet the employment elements aforementioned for any given duties and the extent to which it is possible to employ persons handicapped by (to name a few of the more common conditions encountered) defective vision, defective hearing, deafmutism or orthopedic defects such as amputations or congenital absence of limbs or parts of limbs, or the ankyloses, loss of muscular power or atrophies resulting from disease or injury. Tuberculosis, heart disease, syphilis and hernia are also found in applicants for the government service. The present trend in setting physical standards is to give the handicapped persons every possible opportunity to compete for employment. However, the commission cannot appoint (to other organizations than its own) nor can it extend a preference to civilian applicants who suffer from a handicap as compared to the nonhandicapped citizen. It can admit to an examination, but the individual must pass the mental and other portions of the test with a sufficiently high rating as compared with other competitors to entitle him to have his name presented to an appointing officer. Under the civil service rules a sufficient number of names are presented to the appointing officer to enable him to consider three names in connection with each vacancy to be filled, and the appointing officer has the right to choose any one of the three. Many persons with handicaps enter the competitive examinations and receive appointment.

Honorably discharged soldiers, sailors and marines, however, are an exception, they being given special consideration under law when suffering from service connected disability, and their widows and wives (under certain conditions) are also entitled to this special consideration.

A study has been made whereby persons with a high degree of refractive visual error may, on furnishing evidence on special examination by a recognized ophthalmologist that the defect is due to refractive error alone and not to progressive disease of the eye, are admitted to examinations for positions in which acute vision without glasses is not required provided the vision is corrected by glasses. This does not apply to such positions as policeman, in which the possession of acute vision without glasses is necessary.

Examinations covering many thousand positions are opened to deaf-mutes and the hard of hearing and to persons suffering from orthopedic defects.

The question of applicants who have a history of syphilis has been given much consideration within the past two years. In cooperation with the U. S. Public Health Service, the following procedure has been adopted:

Those persons who have had inadequate treatment, but who are not a hazard to themselves or fellow workers, are accepted for temporary appointment, pending further treatment and medical observation, and this last provision affords them an opportunity for employment while they are still under medical care. Further treatment and medical observation in the case of persons who have had inadequate treatment is the responsibility of the private physician. If, as the result of further treatment and observation, the temporary employee is found to meet the full physical requirements for probational appointment, his temporary appointment is converted to a probational one, effective as of the date that he entered on the temporary appointment.

With respect to persons who have a history of tuberculosis, they are admitted to examinations when the duties are not too arduous, but they cannot be certified as fitted for employment until the condition has been arrested for at least one year and the general health is good.

In dealing with the problem of the handicapped, the commission cooperates with the federal and state bureaus of rehabilitation and with private organizations seeking placement for such individuals.

In government employments, the salaries and hours of labor being fixed by law, it is not possible to have the same flexibility as in private employment. The private employer is not required by law to appoint through competition among all citizens and can therefore permit sympathy to govern his action and can modify the compensation paid to agree with the ability of the individual, by part time or piecework employment or by reduction of wages paid.

During the present emergency a shortage of man power has developed in many employments, and the most important function of the commission at this time is to recruit through publicity of every kind, by radio, through the press or by direct contact, persons who have the special skills or knowledge required to carry out the war program. The shortage in doctors is acute, as also in the supporting occupations of nurse, medical technician and hospital attendant.

The massive increase in current work caused by the emergency has required the postponement of any projects for research or study which will interfere with the immediate objective of providing man power for the war work.

The commission is a service agency, and some idea may be formed of the burden imposed on it when it is noted that, in the twelve months ended last June,

close to ten million pieces of correspondence were received. From June 1, 1940 to Dec. 27, 1941 898,997 placements were made in the War and Navy departments alone—note the alone. This does not mean that the commission has been called on to fill this many new positions. It means that in order to fill vacancies in existing positions, as well as to fill new positions, it has been necessary for us to place this many persons in the federal service.

JUVENILE HYPERTENSION ASSOCIATED WITH UNILATERAL LESIONS OF THE UPPER URINARY TRACT

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AND
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Hypertension in childhood is frequently associated with abnormalities of the upper urinary tract. Lesions may be unilateral or bilateral, congenital or acquired, inflammatory, neoplastic or obstructive. If bilateral the renal disease often advances rapidly to terminate in hypertensive crises and death from apoplexy or from renal or cardiac failure. If the disease is unilateral removal of the involved kidney or correction of the obstruction may effect a decline in blood pressure to lower or normal levels and remission of the hypertensive symptoms.

The purpose of this paper is threefold: (1) to present in detail 1 case of juvenile hypertension associated with pyelonephritis and aplasia of one kidney, relieved by nephrectomy, (2) to review the few reported cases in which surgical treatment has been employed for unilateral renal disease with hypertension in childhood and (3) to discuss certain deductions pertinent to the earlier recognition and diagnosis of this syndrome.

REPORT OF CASE

J. V., a white boy 6 years of age, was referred by Dr. W. M. Thomson, of Delhi, N. Y., on June 11, 1940 because of abdominal pain, anorexia, high blood pressure and convulsions.

Family History.—No history of familial hypertension, cardiac disease or nephritis was elicited.

Past History.—The patient was born at full term by normal, spontaneous delivery. His infancy and early childhood were apparently uneventful. At the age of 5 years he had a rash for two days without subsequent desquamation; at the same time his brother was ill with scarlet fever.

Present Illness.—The present illness began in May 1939, thirteen months prior to admission, with paraumbilical pain which was ascribed by his local physician to infection of the bladder and which persisted intermittently for three months. The child was then asymptomatic until the middle of January 1940, when he had a sudden recurrence of pain around the umbilicus while at breakfast. The pain continued spasmodically during the next six weeks, was frequently precipitated by eating and was accompanied by anorexia and constipation. In April he was sent home from school with an unusually severe attack of the same type of paraumbilical pain. Blood and mucus were obtained by enema. The rectal temperature was 104.6 F. The blood pressure was first recorded at that time; the systolic level was 156 mm. of mercury and the diastolic 114. The boy improved subjectively with conservative therapy, although some elevation in temperature persisted for several weeks. Late in May the systolic pressure was 190. Early in June the abdominal pain recurred. The following day the child was dull and stuporous, vomited several times and frequently expressed a desire to void but was unable to do so. The next morning he had a generalized convulsion which lasted three and one-half hours. During the subsequent three days he was irrational. The systolic blood pressure, recorded by his local physician, was 230.

Physical Examination.—When admitted to the Mary Imogene Bassett Hospital the boy was frail, emaciated and dehydrated; he weighed 36¾ pounds (16.6 Kg.). The rectal temperature was 98.4 F.; the pulse rate was 86 per minute and the respiratory rate 20. The systolic blood pressure was 230; the diastolic, 180. The tonsils were deeply embedded and cryptic; the pharynx, granular. There was slight dulness, with some limitation of respiratory excursion at the pulmonary bases. The heart was enlarged to the left; the cardiac sounds were exaggerated, particularly over the aortic area; no murmurs were audible. The radial arteries were distinctly thickened and difficult to compress. The abdomen was moderately distended and "doughy" in consistency throughout, particularly in the right hypochondrium; there was some tenderness just above the umbilicus; no masses were palpable; neither kidney could be felt. The deep reflexes were normal.

Ophthalmic Examination.—Both pupils were partially dilated and reacted only slightly to light. The cornea and iris of each eye were normal; the tension was normal to palpation. Both disks were choked, the right more so than the left. Large "cotton wool" areas of exudate were seen on the temporal side of both disks; there were also two small areas nasal to the left disk. There was edema of both macular regions and an old healed lesion in the right. Dr. James I. Farrell, who made the examination, expressed the belief that these changes were "without any doubt due to hypertension."

Laboratory Data.—Urine: The maximal specific gravity of the urine was 1.010; the reaction, alkaline. A slight trace of albumin was present. The sediment contained a few clumped and single leukocytes and an occasional hyaline cast.

Blood: The hemoglobin content was 12.9 Gm. per hundred cubic centimeters. The erythrocyte count was 4,450,000 per cubic millimeter and the leukocyte count was 32,500 per cubic millimeter with 95 per cent polymorphonuclear neutrophils; the hematocrit reading was 34.9 per cent cells; the sedimentation rate was 26 mm. in one hour corrected.

Blood Chemistry: The concentration of blood sugar was 93 mg. per hundred cubic centimeters; of nonprotein nitrogen, 29 mg.; of total serum protein, 5.82 Gm.; of albumin, 2.97 Gm.; of globulin, 2.85 Gm.; of calcium, 9.3 Gm.; of chloride, 88.7 milliequivalents.

Stool: The guaiac test for occult blood gave a 4 plus reaction; no ova or parasites were found.

Renal Function: The excretion of phenolsulfonphthalein was 50 per cent in the first hour and 10 per cent during the second hour.

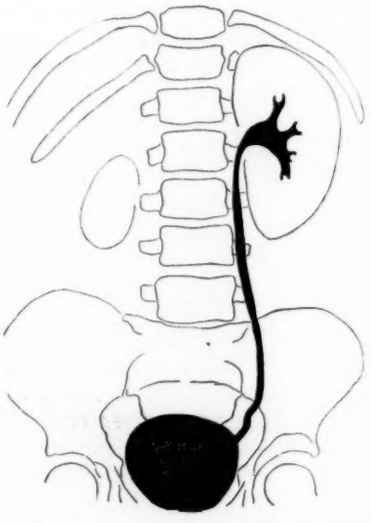

Fig. 1.—Tracing of the intravenous pyelogram. The right renal shadow was small and indistinct; no dye was apparent on this side. The left renal shadow was large; the calices, pelvis and ureter were normal.

Roentgenologic Studies.—A roentgenogram of the chest showed nothing of note in the pulmonary fields. Employment of a barium sulfate enema revealed no abnormality of the colon. Intravenous pyelograms disclosed no opaque medium in the calices or pelvis of the right kidney; the calices, pelvis

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Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

and ureter on the left side were well visualized and seemed normal; the right renal shadow was small and indistinct; the left was large, smooth in outline and normal in contour (fig. 1).

Course.—During the first eight days in the hospital the boy was drowsy and fretful and continued to have anorexia and intermittent attacks of abdominal pain. The systolic blood pressure varied from 200 to 244; the diastolic, 150 to 208 (fig. 2). The hemoglobin content dropped to 10.6 Gm.; the erythrocyte count, to 2,980,000 per cubic millimeter, and the leukocyte count, to 20,900, with 82 per cent polymorphonuclear neutrophils. Cystoscopy, ureteral catheterization and retrograde pyelography were planned, but the boy was so apprehensive that the examination could not be conducted without subjecting him to anesthesia, which seemed at the time an unnecessary hazard. The data at hand appeared adequate to warrant exploration of the right kidney without further investigation.

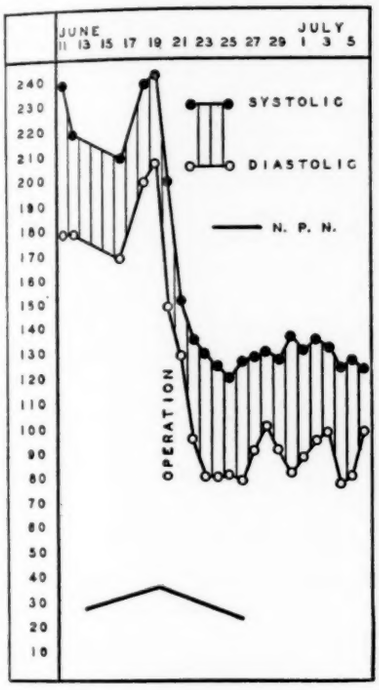

Fig. 2.—The blood pressure in millimeters of mercury and the nonprotein nitrogen level in milligrams per hundred cubic centimeters of blood during hospitalization.

Operation.—Nephrectomy and subtotal adrenalectomy on the right side were performed, with general drop ether anesthesia. The renal fossa was exposed by a transverse incision from the costolumbar angle forward to the linea semilunaris. By retroperitoneal dissection a tiny structure resembling a ureter was identified and followed upward to the point at which it terminated in a miniature thin-walled pelvis, surrounding which was a small aplastic kidney about twice the size of a lima bean (fig. 3). The kidney and the upper portion of the ureter were removed.

The appearance of the right adrenal gland was normal. The lower half was excised and the wound closed in layers.

Surgical Specimen.—Macroscopic Description: The kidney weighed 4 Gm. and measured 4 cm. in length by 2 cm. in greatest width; it was flattened from side to side and measured only 6 mm. in thickness. The capsule was about 1 mm. thick and firmly adherent to the kidney and ureter. The exposed surface was pale pinkish yellow; no scars were apparent. Anterior to the pelvis, at the margin of the renal parenchyma, were three small vessels with diameters much less than 1 mm.; posterior to the pelvis were two vessels, each about 1 mm. in diameter. None of these showed any gross thickening or thrombosis. On section, the pelvis and calices were relatively enlarged with respect to the renal parenchyma. Over the calices the parenchyma was only 5 mm. wide; there was no color or marking to suggest normal renal structure. The attached ureter was 5.5 cm. long; the lumen was patent.

The adrenal tissue was grossly normal and measured 1.3 by 1.2 by 0.5 cm.

Microscopic Description: The small size of this kidney was the result of aplasia with superimposed chronic pyelonephritis. Certain areas were devoid of glomeruli or their scars and were characterized by the predominance of wavy collagen fibers supporting scattered collecting tubules and tubules lined with pelvic epithelium (fig. 4). Such areas were indicative of faulty renal development. Other sections showed periglomerular fibrosis, interstitial lymphocytic infiltration and dilatation of tubules with colloid casts that were considered typical of chronic pyelonephritis (fig. 5). The arteries and arterioles revealed the changes characteristic of hypertension. The arterioles showed hyperplastic arteriosclerosis (fig. 6); the medium-sized arteries showed severe productive endarteritis and the larger ones moderate endarteritis (fig. 7).

The sections of adrenal tissue were normal.

Diagnoses.—The diagnoses were chronic pyelonephritis, aplasia and arteriosclerosis of the kidney.

Postoperative Convalescence.—The systolic blood pressure fell steadily to 130 and the diastolic to 94 on the second postoperative day (fig. 2), at which levels, with a little diurnal variation, they remained during the subsequent convalescence. The wound healed by first intention. Reexamination of the fundi on the sixth day disclosed less dilatation of the pupils, less swelling and edema of the disks and maculas and no fresh hemorrhages; there was still a considerable number of "cotton wool" areas of exudate. One week later the appearance of both disks was much improved, with only slight residual blurring of the margins. No hemorrhages were seen, and the exudate was gradually disappearing. The visual fields and the vision of each eye were normal. Ten days after operation the hemoglobin content was 12.1 Gm.; the erythrocyte count, 4,020,000, and the leukocyte count, 9,000, with 62 per cent polymorphonuclear neutrophils. The stool contained no occult blood. The specific gravity of the urine varied from 1.009 to 1.013, and the culture was sterile. Clinical improvement was striking, and the patient was discharged on July 6. His weight was 41 pounds (18.6 Kg.).

Subsequent Observations.—On July 24 the boy looked remarkably well. The heart was not enlarged, and the sounds were normal. The systolic blood pressure was 140; the diastolic, 100. The fundi, the visual fields and the vision of each eye were normal.

In April 1941, ten months after operation, the patient was readmitted to the hospital for study. During the interim he had been going to school and leading a normal, active life. His appetite was good, his bowel movements regular without catharsis and his urination normal. He had had no headache and no abdominal pain. He had gained 12 pounds (5.4 Kg.). Except for some enlargement of the tonsils and injection of the pharynx, the results of complete physical examination were normal. There was no thickening of the radial arteries. Both pupils were round and reacted well to light and in accommodation. The tension of each eye was normal to palpation. The media were clear throughout. Both disks were normal in color, with sharp, clear margins and rather large, deep physiologic cups. The blood vessels appeared entirely normal, and no areas of exudate, hemorrhage or atrophy were seen in either fundus. The blood pressure was 130 systolic and 80 diastolic. Twenty-four consecutive hourly readings did not vary more than 5 mm. above

Fig. 3.—Posterior surface of the aplastic right kidney, pelvis and upper portion of the ureter.

or below these levels. During the cold pressor test the systolic pressure rose to 175 and the diastolic to 120; one minute later both had returned to their previous levels.

The hemoglobin content and the erythrocyte, leukocyte and differential counts were normal. The specific gravity of the urine was 1.025; there was no albumin, and the sediment was normal. The excretion of phenolsulfonphthalein was 60 per cent in the first hour and 12 per cent in the second. The

nonprotein nitrogen content of the blood was 21 mg. per hundred cubic centimeters; the values for total protein, albumin, globulin, calcium and phosphorus in the serum were normal.

COMMENT

The blood pressure, ten months after nephrectomy, is not normal for a boy of his age. However, it has remained well below the preoperative levels and all symptoms of hypertension have disappeared.

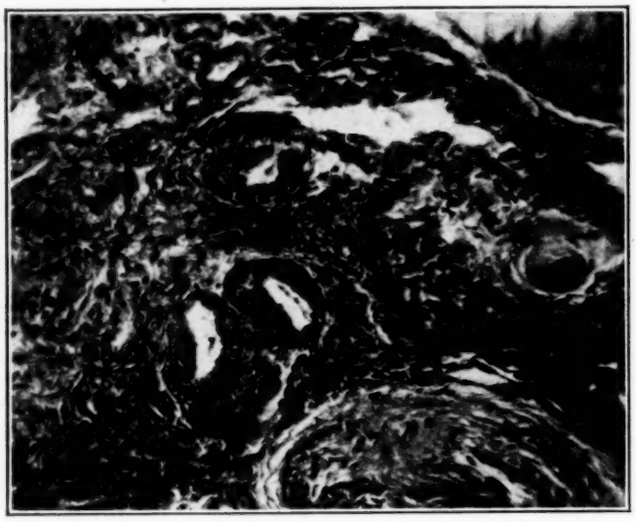

Fig. 4.—Section of an area of incomplete renal development. Several tubules lined with transitional epithelium are scattered through a region made up of collagen fibers and connective tissue.

The excessive response to the cold pressor test suggests that the child should now be included in the group termed by Hines [1] "hyperreactors," in which he has classified as "prehypertensive" those children who have excessively labile blood pressures.

The failure of this boy's pressure during rest and sleep to fall significantly below 130 systolic and 80 diastolic may be indicative of unsuspected pyelonephritis and arteriosclerosis of the remaining kidney. Nevertheless, as measured by the usual tests the function of this organ is normal and the child is apparently well. Whether he will remain well can be determined only by the lapse of time.

From the gross and microscopic examination of the surgical specimen, it seems probable that the hypertension was due to pyelonephritis superimposed on congenital hypoplasia of the kidney [2] which, in turn, was secondary to defective arteriogenesis.[3]

REVIEW OF REPORTED CASES

Survey of the literature discloses only a small group of patients under 14 in whom hypertension associated with unilateral renal disease was relieved, at least temporarily, by removal of the affected kidney. These cases represent the group with which this paper is concerned and in which thorough urologic investigation and well planned operative attack may effect a decline in blood pressure. The renal lesions in the 10 reported cases may be classified dominantly (1) neoplastic, (2) obstructive, (3) congenital or (4) inflammatory. The reported cases of each type of lesion are reviewed briefly herewith.

1. *Neoplastic Lesions.*—Pincoffs and Bradley [4] first called attention to the association between neoplasm of the kidney and hypertension in children. In 1937 they published 4 cases of Wilms's tumor in infancy and early childhood; the tumor in each case was associated with hypertension. Two of the patients were operated on; nephrectomy was followed by a temporary drop in blood pressure; hypertension returned with recurrence of the tumor. The authors came to the conclusion that "the hypertension was in some way a consequence of the tumor growth," but they were unable to find any pressor substance in "extracts of the tumor or the inclusion within it of aberrant chromaffin tissue." Three years later Koons and Ruch [5] reported relief of hypertension by nephrectomy for Wilms's tumor in a girl aged 7 years. They expressed the opinion that the preoperative elevation of the blood pressure was probably due to interference with renal circulation by pressure of the tumor invading the pedicle and the adjacent lymph nodes or by pressure of the neoplastic mass around the kidney, acting in the same manner as the cellophane envelope used experimentally by Page.[6]

2. *Obstructive Lesions.*—Bothe [7] has published 2 cases of juvenile hypertension associated with hydronephrosis secondary to ureteral obstruction. The first was that of a girl with obstruction caused by an aberrant vessel at the ureteropelvic junction; the blood pressure four and one-half years after nephrectomy was normal. In the second case, that of a boy with constriction at the ureterovesical junction, the blood pressure declined after operative relief of the obstruction by incision and dilation of the ureteral orifice.

3. *Congenital Lesions.*—Leadbetter and Burkland [8] have reported an extremely interesting case of hypertension of unilateral renal origin which may well be

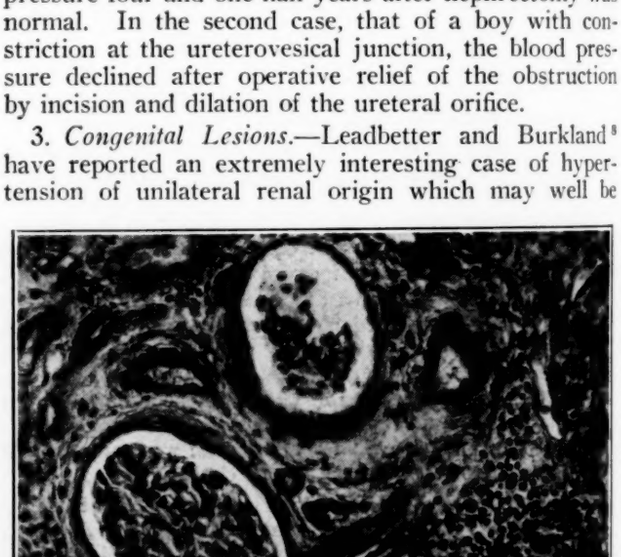

Fig. 5.—Section of an area of chronic pyelonephritis. The fibrous interstitial tissue is infiltrated with lymphocytes.

included in this category. The patient was a Negro boy aged 5½ years with an ectopic kidney the main artery of which was partially occluded by "an intra-arterial

1. Hines, E. A., Jr.: The Hereditary Factor in Essential Hypertension, Ann. Int. Med. **11**: 593-601 (Oct.) 1937.
2. Weiss, Soma, and Parker, Frederic, Jr.: Pyelonephritis: Its Relation to Vascular Lesions and to Arterial Hypertension, Medicine **18**: 221-315 (Sept.) 1939.
3. Coplin, W. M. L.: Unilateral Renal Hypoplasia and Dysplasia Due to Defective Arteriogenesis: Relation to So-Called Hypogenetic Nephritis, Am. J. M. Sc. **153**: 381-395, 1917.
4. Pincoffs, M. C., and Bradley, J. E.: The Association of Adenosarcoma of the Kidney (Wilms' Tumor) with Arterial Hypertension, Tr. A. Am. Physicians **52**: 320-325, 1937.
5. Koons, K. M., and Ruch, M. K.: Hypertension in a Seven Year Old Girl with Wilms' Tumor Relieved by Nephrectomy, J. A. M. A. **115**: 1097-1098 (Sept. 28) 1940.
6. Page, I. H.: The Production of Persistent Arterial Hypertension by Cellophane Perinephritis, J. A. M. A. **113**: 2046-2048 (Dec. 2) 1939.
7. Bothe, A. E.: Pyelonephritis in Children and Adults with Hypertension, J. Urol. **42**: 969-981 (Dec.) 1939.
8. Leadbetter, W. F., and Burkland, C. E.: Hypertension in Unilateral Renal Disease, J. Urol. **39**: 611-626 (May) 1938.

mass of smooth muscle, thought probably congenital" in origin. The elevation of blood pressure in this case presumably developed under conditions which simulated closely those produced experimentally in animals by unilateral application of the Goldblatt clamp.[9] After nephrectomy the blood pressure fell promptly to normal.

4. *Inflammatory Lesions.*—Patients with lesions of this type included those on whom interest is chiefly

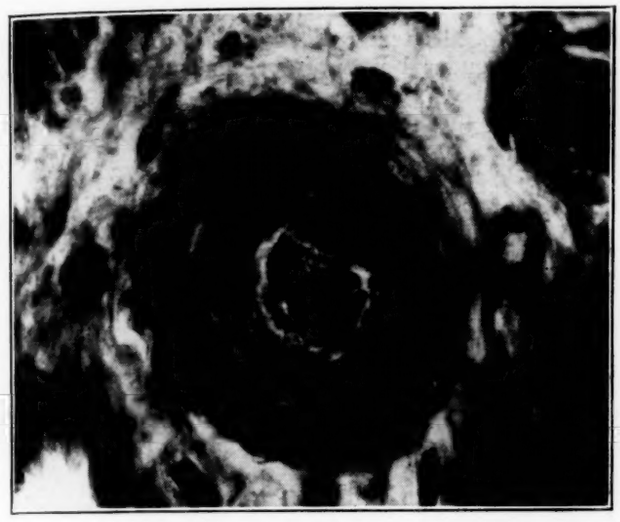

Fig. 6.—Section of an arteriole from an area of chronic pyelonephritis. Advanced hyperplastic arteriosclerosis is apparent.

focused at the present time, namely children and adults with hypertension secondary to chronic pyelonephritis. In the literature there are numerous cases proved by postmortem examination in which juvenile hypertension was associated with bilateral pyelonephritis. However, only 4 cases of patients under 14 years of age have been discovered in which the renal lesion was unilateral and in which nephrectomy was followed by a decline in blood pressure to normal or essentially normal levels. These cases were published by Butler,[10] Barney and Suby,[11] Patch, Rhea and Codnere [12] and Kennedy, Barker and Walters.[13] The immediate operative results have been excellent, but, as is true of the case reported in detail earlier in this presentation, the children have not yet been observed over a sufficient period of time for one to state with assurance that the hypertension has been permanently relieved by nephrectomy.

The renal lesions which may be responsible for hypertension in childhood are many and varied; only a few are amenable to operative treatment. Obviously, the first criterion for successful operation is that the lesion be unilateral. Secondly, the diagnosis should be made and treatment instituted before irreversible changes have taken place in the opposite kidney and in the cardiovascular system.

Early recognition of unilateral lesions is essential. Except in cases of neoplasm the history usually dates back several years. If pyelitis or pyelonephritis in infancy or early childhood is followed by persistent enuresis, frequency of urination, nocturia, dysuria, pyuria or hematuria, headache, disturbance of vision, nausea, vomiting or abdominal pain, singly or in any of the possible combinations thereof, the child should be investigated with scrupulous care. In addition to a complete physical examination, the investigation should include (1) careful determinations of the blood pressure during rest and sleep; (2) its response to specific stimuli; (3) repeated examinations of the urine, with cultures if indicated; (4) tests of renal function, and (5) roentgenograms of the urinary tract, including pyelograms after the intravenous, intramuscular or subcutaneous injection of diodrast. If a suspected or obvious lesion of one kidney is apparent from these studies, the further investigation should include cystoscopy, ureteral catheterization, study of the urine from and the function of each kidney separately, and retrograde pyelography.

The same type of thorough investigation of the urinary tract should be carried out on all children with high blood pressure the cause of which is not readily apparent.

Determination of the systolic and diastolic pressures should be an integral part of the physical examination of every child. A moderate elevation of blood pressure found during a routine examination in the office must not be disregarded. Hypertension may appear insidiously and progress rapidly to a malignant phase. By diligent search for unilateral renal disease it may be possible occasionally to detect an early lesion and institute operative therapy before secondary malignant manifestations of the disease have occurred.

We do not agree with Schroeder and Fish [14] that retinitis is a contraindication to operation in advanced

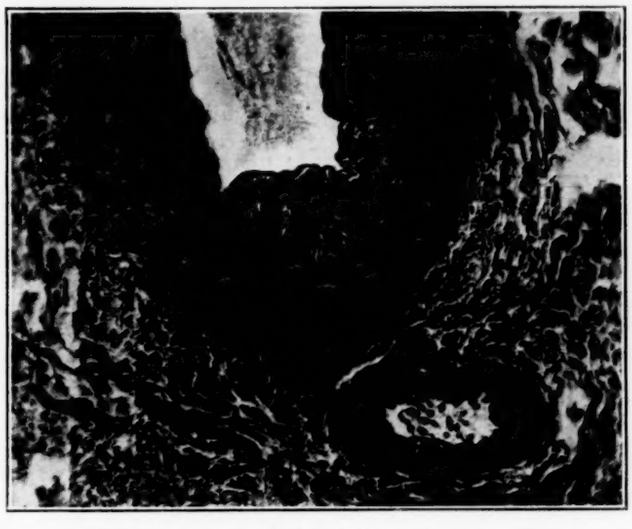

Fig. 7.—Section of a large branch of the renal artery. There is productive endarteritis.

stages but believe that any child, even though he appears to be in the terminal, malignant phase of hypertension, should have as complete a urologic investigation as possible and be treated surgically if definite evidence of unilateral renal disease is found, provided that the structure and function of the opposite kidney are essentially normal and provided further, that the child's general condition will permit the risk of a major operation.

9. Goldblatt, Harry; Lynch, J.; Hanzal, R. F., and Summerville, W. W.: Studies on Experimental Hypertension: I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia, J. Exper. Med. **59:** 347-380 (March) 1934.

10. Butler, A. M.: Chronic Pyelonephritis and Arterial Hypertension, J. Clin. Investigation **16:** 889-897 (Nov.) 1937.

11. Barney, J. D., and Suby, H. I.: Unilateral Renal Disease with Arterial Hypertension: Report of a Case Apparently Cured Following Nephrectomy, New England J. Med. **220:** 744-746 (May 4) 1939.

12. Patch, F. S.; Rhea, L. J., and Codnere, J. T.: Hypertension in a Girl of Twelve, Associated with Unilateral, Atrophic Pyelonephritis: Treated by Nephrectomy, Canad. M. A. J. **43:** 419-424 (Nov.) 1940.

13. Kennedy, Roger L. J.; Barker, N. W., and Walters, Waltman: Malignant Hypertension in a Child: Cure Following Nephrectomy, Am. J. Dis. Child. **61:** 128-134 (Jan.) 1941.

14. Schroeder, H. A., and Fish, G. W.: Studies on "Essential" Hypertension: III. The Effect of Nephrectomy on Hypertension Associated with Organic Renal Disease, Am. J. M. Sc. **199:** 601-616 (May) 1940.

CONCLUSION

Juvenile hypertension may be secondary to unilateral disease of the kidney. The renal lesions may be classified as primarily neoplastic, obstructive, congenital or inflammatory.

A thorough investigation of the urinary tract should be carried out on every child with a previous history of pyelitis or pyelonephritis who has symptoms referable to the central nervous system, the cardiovascular system, the gastrointestinal tract or the genitourinary tract. The same investigation should be pursued in every case of unexplained juvenile hypertension.

If disease of one kidney is discovered the patient should be treated by operation provided the function of the opposite kidney is essentially normal and the general condition of the child is adequate for him to withstand surgical intervention.

With the exception of cases in which hypertension was secondary to renal neoplasm, the immediate results of operative treatment in all reported cases, including the one herein recorded, have been excellent. Too little time has yet elapsed for one to state with certainty that the hypertension in any case has been permanently relieved.

FIBROSIS AND SUBMUCOUS CALCIFICATION OF THE VESICAL NECK

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The title of this paper is rather all inclusive; however, my object is to review fibrosis (submucous fibrosis) of the vesical neck in children and to report an unusual case of fibrosis with submucous calcification of the vesical orifice in a boy 13 years of age.

From a review of the literature it would appear that fibrosis of the vesical neck in children is a rare disease. Campbell [1] reported finding but 12 cases in the literature up to 1930. The disease may be more frequent than the reported cases would indicate, and at times this condition probably goes unrecognized until late in life. Young,[2] in a study of 355 adults with fibrosis of the bladder neck, found 20 cases, or 5.6 per cent, with a history of imperfect urination since childhood, which indicated that the obstruction to urination was probably congenital. Submucous calcification of the vesical neck in a child is a most unusual condition, and there is no reference to a similar case in the literature.

Fibrosis of the vesical neck is characterized by proliferation of fibrous tissue in the submucosa and into the muscle fibers of the internal sphincter. The resulting contraction of this fibrous tissue produces a contracture of the bladder neck. Fibrosis of the vesical neck is not necessarily synonymous with "median bar." Herbst [3] considers "that the term 'median bar' should be applied to elevations which occur on the floor of the bladder from the immediate bladder neck to the edge of the trigon. While contracture or fibrosis of the vesical neck should be applied to those cases in which the entire circumference of the neck of the bladder is converted into fibrous tissue." It would seem, however, that one type of "median bar" is but a partial fibrosis of the vesical neck in which the fibrotic tissue appears only on the floor of the vesical orifice.

AGE

Fibrosis of the vesical neck may occur at any age. The disease may be congenital and produce symptoms in infancy, or the symptoms of the disease may not be pronounced until later in life. This would seem to indicate that the fibrosis is a progressive disease.

In Campbell's series of 41 clinical cases there were 7 patients under 1 year of age, and in 19 cases symptoms had been present since birth.

SEX

Fibrosis of the vesical neck is usually a disease of the male, but Campbell has reported 3 cases in females. Beer [4] reported 2 cases in the female in over 30 clinical cases, and, in a series of 9 cases of contracture of the vesical neck reported by Caulk,[5] 5 were in females.

ETIOLOGY

The exact etiology of fibrosis of the vesical neck in children is unknown. Since the disease is found in infancy, and since many adults with fibrosis of the vesical neck give a history of urinary difficulties dating from childhood, it seems probable that the obstruction may be congenital. In attempting to establish the etiology, one must keep in mind that the patients are usually seen late in the course of the disease and that the pathologic condition of the bladder neck as seen at the time the diagnosis is made may not represent the pathologic condition present at the onset of the disease.

The reported cases of fibrosis of the vesical neck can be divided into three groups, and although the apparently etiologic factors overlap there are certain characteristics about the patients in each classification. First are those that appear to be congenital and not associated with other congenital diseases affecting the urinary tract.

When one refers to congenital fibrosis of the vesical neck there is always the possibility that the fibrosis as such is not congenital but that it is secondary to other congenital defects of the vesical orifice. In this group must be considered congenital hypertrophy of the internal sphincter muscle, similar to congenital pyloric stenosis. It is also likely that some patients have a congenital partial atresia of the bladder orifice similar to that which occurs at the meatus, in the urethra or in other hollow viscera.

Herbst has reported a case of hypertrophy of the bladder neck with obstruction in a boy 9 months of age. The microscopic sections of the bladder neck showed no fibrous changes, but many of the muscle fibers contained vacuoles, probably an indication of beginning degeneration. It seems probable, as suggested by Herbst, that "the trauma produced at the neck of the bladder by months or years of imperfect urinary function, often associated with infection, convert these hypertrophic muscle fibers into fibrous tissue." Further suggestion that the disease may be congenital is found in Wilhelmi's [6] report of congenital median bars occurring in twin brothers.

In Campbell's reported series of contracted bladder outlet there were 7 cases in children under 1 year of age, which again would indicate that there is a con-

Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

1. Campbell, M. F.: Pediatric Urology, New York, Macmillan Company, vol. 1, p. 353; Submucous Fibrosis of the Bladder Outlet in Infancy and Childhood, J. A. M. A. **94**: 1373 (May 3) 1930; J. Urol. **27**: 157 (Feb.) 1932.
2. Young, H. H., and Davis, D. M.: Young's Practice of Urology, Philadelphia, W. B. Saunders Company, 1926, vol. 2, p. 501.
3. Herbst, R. H.: Fibrosis of Vesical Neck, J. A. M. A. **91**: 1014 (Nov. 24) 1928.
4. Beer, Edwin: Chronic Retention of Urine in Children, J. A. M. A. **65**: 1709 (Nov. 13) 1915.
5. Caulk, J. R.: Surg., Gynec. & Obst. **63**: 80 (July) 1936.
6. Wilhelmi, O. J.: Congenital Median Bars Occurring in Twins, J. A. M. A. **101**: 848 (Sept. 9) 1933.

genital factor responsible for this disease. But in the analysis of congenital fibrosis of the vesical neck one is inclined to consider the fibrous infiltration as implanted on congenital muscular hypertrophy, or atresia of the vesical neck.

The second group includes those cases in children in which the fibrosis of the vesical neck is associated with a neurogenic vesical dysfunction, as seen most frequently in spina bifida.

Mertz and Smith,[7] in a series of 13 personal cases and 26 collected cases with posterior spinal fusion defects, found 34 with day or night urinary incontinence, associated with known bladder retention in 15. Of the 13 personal cases reported, a careful investigation of the urethra and vesical neck failed to disclose any mechanical factor causing obstruction; however, at operation a contracted vesical orifice was found in 1 patient. The authors concluded that the nerve dysfunction was due to pressure and was not caused by the bony hiatus alone.

In Campbell's series of 41 cases of contracture of the bladder outlet, spina bifida occulta was present in 6. In certain cases of spina bifida there are found disturbances of innervation of the urogenital organs and usually other neurotrophic changes involving the rectal sphincter and the lower extremities. The bladder disturbance depends on the extent of the interference with the nerve tracts and on the pathways involved, whether these are sympathetic, parasympathetic (pelvic nerve) or somatic (pubic nerve). The bladder disturbance will also be dependent on the involvement, whether it is unilateral, bilateral, motor or sensory and, as frequently happens, the dysfunction is of a mixed character. The neurogenic disturbances of the bladder may produce a spastic or hypertrophic internal sphincter muscle, but this condition is not identical with fibrosis of the vesical neck.

That spina bifida (with an associated neurogenic bladder disease) and fibrosis of the vesical neck may be found in the same patient is evident from the literature and from personal observations of the patient reported in this paper, but the relationship of the nerve dysfunction to the fibrosis is not quite clear. The question arises as to whether we are dealing with two congenital defects in the same child or whether the neurogenic disease of the bladder is simply one of the etiologic factors in fibrosis of the vesical neck.

As suggested by Beer, it may be in these cases that the fibrosis is a secondary change produced in a spastic internal sphincter associated with a neurogenic bladder. One must also consider that disturbances of vital cell metabolism or vascular changes caused by an interference with the nerve function may lead to a degenerative process which is followed by fibrotic changes.

The third group includes the acquired form of fibrosis of the vesical neck. This is much more common in adults than in children, the fibrosis usually being confined to the posterior region of the vesical sphincter, producing a fibrous bar. This type of contracture of the bladder orifice may have its origin in trauma or infections of the posterior urethra, prostate or possibly from distant foci. Groups 1 and 2 are most frequently seen in children, but group 3 may occur in late childhood, when there is an associated disease of the deep urethra.

SYMPTOMS

The symptoms are essentially those of bladder neck obstruction plus damage to the upper urinary tract and are dependent on interference with the opening and closing of the internal sphincter and hypertrophy of the bladder musculature. The degree of obstruction determines the severity of the symptoms. Painful urination and incontinence are the essential symptoms, and, when the incontinence predominates, it often leads to the erroneous diagnosis of enuresis. Once the patient is labeled a "bed wetter," further investigation frequently stops and the disease remains untreated, such delay in treatment resulting in increased infection and kidney destruction.

As the disease progresses there may be retention of urine and pains in the lower part of the abdomen which radiate to the kidneys. Catheterization may be necessary but at times is impossible, owing to the tightness of the vesical opening. Chills and fever often accompany the kidney infection.

DIAGNOSIS

The diagnosis is arrived at by not overlooking the fact that children with pyuria, frequency, painful urination or enuresis may have an obstruction of the bladder neck. There are four diseases from which fibrosis of the vesical neck must be differentiated: stricture, congenital valves of the posterior urethra, hypertrophy of the verumontanum and a neuromuscular vesical disturbance.

The usual urologic examination and roentgenograms of the urinary tract will give an indication of the damage to the urinary tract, but the differential diagnosis rests primarily on the cystoscopic findings. Valves of the deep urethra and hypertrophy of the verumontanum can be visualized, and stricture is detected by urethroscopy and the passing of bougies.

It is more difficult to differentiate fibrosis of the vesical neck from a neurogenic disease of the bladder. Roentgen ray evidence of spina bifida suggests a neuromuscular disease, and cystometric studies are a valuable aid in differentiating myogenic from neurogenic changes of the bladder.

An atonic bladder with residual urine having either a spastic or a relaxed vesical sphincter is the usual picture of a neurogenic disease.

In the presence of a fibrosis of the vesical neck, cystoscopy may be difficult. If the cystoscope can be passed to the bladder, there is felt a resistance at the internal sphincter accompanied by a "jump" as the cystoscope passes over the firm fibrous tissue. The changes in the vesical orifice as seen through the cystoscope will be dependent on the extent of the fibrosis. The portion of the outlet involved will appear as an elevated, firm, resistant ridge. If only the posterior area is involved there will be seen a so-called "median bar." When the fibrosis includes the entire bladder outlet there is a "rounded ridgelike collar intrusion" (Campbell). There are usually present a contracted bladder, with hypertrophy of the bladder wall and trigon. One must remember that fibrosis of the vesical neck and a neurogenic vesical dysfunction may be present in the same patient. On rectal examination there is often a palpable, firm, fixed area in the region of the fibrotic vesical neck.

PATHOLOGY

The pathologic conditions characteristic of this disease are those associated with obstructions of the bladder neck. The degree of urinary tract damage is dependent on the degree of the obstruction and the length of time the obstruction has existed. In most of the cases reported there was found hypertrophy of the bladder muscle, dilatation of the ureters with regurgitation and hydronephrosis or pyonephrosis with destruction of the kidney parenchyma. Many of the patients are moribund

7. Mertz, H. O., and Smith, L. A.: J. Urol. **24**: 41 (July) 1930.

at the time the diagnosis is made, and postmortem findings are common.

The microscopic appearance of the tissue removed from the bladder orifice is usually that of a fibrous infiltration in a thickened submucosa. In some instances hypertrophy of the internal sphincter muscle is mentioned. More frequently there is a degeneration of the muscle, and there is seen proliferation of fibrous tissue between the muscle fibers. Lymphocytes predominate in the cellular exudate, with no evidence of acute inflammatory changes.

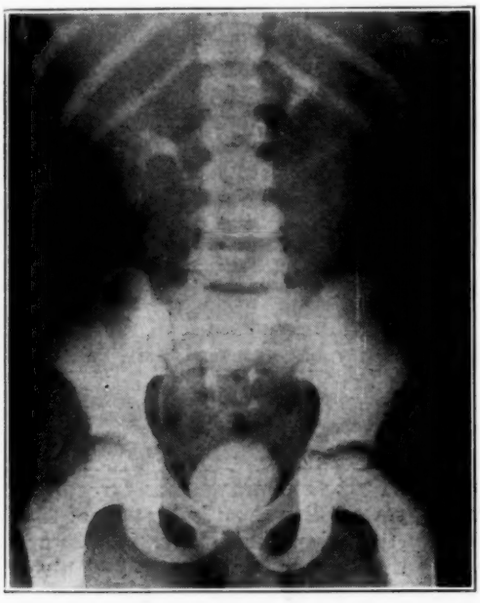

Fig. 1.—Intravenous pyelogram made when the boy was 8 years of age. The urinary tract appears fairly normal, and there is no evidence of urinary calculi. There is failure of closure of the third, fourth and fifth lumbar and of the sacral vertebrae.

TREATMENT

Dilations of the urethra, or diathermy administered through a sound as suggested by Lazarus, may relieve the symptoms in some patients, but after proper preoperative preparation the treatment of this disease is surgical removal of all or part of the obstruction. In children this is usually best done through the open bladder, the excision of one or more wedge shaped pieces of fibrous tissues from the vesical orifice being sufficient. Postoperative dilations of the vesical orifice should be done.

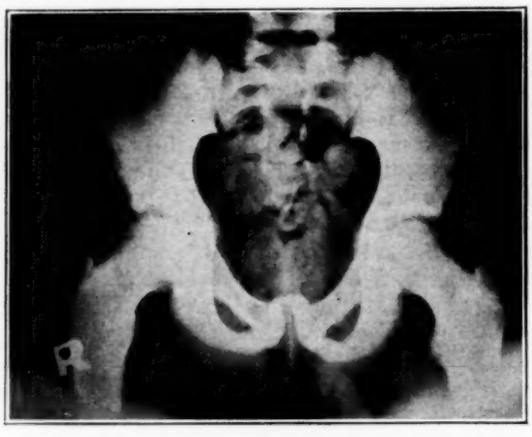

Fig. 2.—In this plain roentgenogram, taken at the time the patient was admitted to the hospital, there is seen a shadow just posterior to the symphysis pubis.

REPORT OF CASE

History.—A white boy aged 13 years had been operated on four days after birth for a spina bifida cystica and the sac removed. Up until about 8 years of age there had been incontinence of both the rectum and the bladder. About this time he gradually acquired control of the rectum, but there was no improvement as regards the bladder. The urine dripped continuously, although at times the boy voided small amounts of urine. It was necessary for him to wear pads for protection of his clothing. His mental and physical growth was normal, except that the left leg and foot were smaller than the right.

When 8 years of age the boy was examined by his family physician for the enuresis. No evidence of urine retention was found. A roentgenographic study of the urinary tract showed no stone shadows, and the intravenous pyelograms showed both kidney pelves, the ureters and the bladder to be of fairly normal size and contour (fig. 1). The bladder was somewhat pear shaped, but the walls were smooth in outline. There was seen in the films a failure of closure of the third, fourth and fifth lumbar, and all of the sacral vertebrae. Atropine was prescribed, but the boy obtained no relief.

Fig. 3.—In the cystogram the shadow is seen to lie outside the bladder. The walls of the bladder are smooth, and there is no evidence of regurgitation of the medium.

At the age of 11 (two years before the present illness) he experienced occasional pains in the penis and the bladder, and the urine did not "dribble" freely from the bladder. When he tried to urinate, the stream was very small and the pain was more intense. The pain gradually increased, there was marked straining on urination, and he used pressure on the abdomen "to force the urine out." There was still day and night incontinence, but the amount of urine seemed less and he used fewer pads.

For two weeks prior to admission to the hospital the patient had severe bladder and abdominal pain and he voided but small amounts of urine. He obtained some relief from the pain with hot baths and sedatives.

Examination.—The head, neck, chest and upper extremities were normal. The abdomen was normal except for a moderate suprapubic dulness, evidently from a distended bladder. The left leg and foot were smaller than the right and there was hyperdorsal flexion of the left foot. The right thigh and calf were ¾ inch larger in circumference than the left. Over the sacrum was an operative scar. There were loss of touch and superficial pain sensations on the inner aspect of both buttocks, but no other sensory changes were noted. Catheterization was difficult and painful. A number 8 Coudé catheter was passed and the residual urine was between 8 and 10 ounces (300 cc.).

The urine contained a trace of albumin; no sugar was present. The p_H was 5.5, and microscopic examination showed 4 plus pus and a few red blood cells. Culture revealed a growth

of a nonhemolytic streptococcus. The blood Wassermann reaction was negative. The blood calcium was 11.5 mg. per hundred cubic centimeters. Blood count revealed hemoglobin 95 per cent, red blood cells 5,180,000, white blood cells 9,200. The phenolsulfonphthalein excretion (postoperative) first hour was 40 per cent and second hour 15 per cent, total 55 per cent.

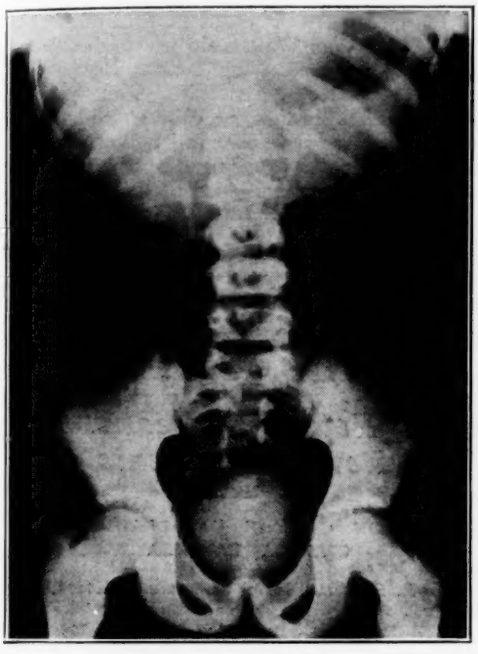

Fig. 4.—In the intravenous pyelogram the upper urinary tract appears to be fairly normal. The bladder is smooth in contour. The shadow seen in the plain film is shown to lie outside the bladder.

On a plain roentgenogram (fig. 2) was seen a group of dense contiguous shadows forming a complete ring except in the anterior portion. The shadows had the density of vesical calculi and appeared to lie near the vesical orifice or within the prostate. However, the cystogram (fig. 3) showed the shadows to lie outside the bladder but apparently in the region of the urethrovesical junction. The bladder was of normal size and the wall was smooth. There was no evidence of diverticula or regurgitation of the medium up the ureters. The intravenous pyelograms (fig. 4) demonstrated a very mild degree of bilateral hydronephrosis. The function of both kidneys, as judged by the rate of excretion of the dye, was about normal.

There was some relaxation of the rectal sphincter. The prostate was not definitely palpable, but a very firm area was felt in the region of the prostate and vesical orifice.

There was an obstruction at the vesical neck which prevented the passage of either an infant size or a number 18 cystoscope to the bladder. With difficulty a woven catheter was again

Fig. 5.—Stones removed from the submucosa at the vesical neck.

introduced. No cystometric studies were made. Following this examination the patient had chills and fever for several days and there was increased difficulty in the expression of the urine.

Operation.—A preoperative diagnosis of calcification at the urethrovesical orifice was made, and on Sept. 12, 1939 under gas anesthesia a cystotomy was performed. The bladder was above normal thickness. The mucosa was smooth but hyperemic. There were no stones in the bladder. The vesical orifice was extremely hard; the opening was small and would not permit the introduction of a finger tip. An incision was made through the thickened mucosa at the vesical orifice and a hard stone was encountered. A circular incision was then made around the orifice, and six bean sized stones were removed from both lateral and posterior submucosa (fig. 5). A V shaped segment was then excised from the floor at the urethrovesical junction. The prostate was not demonstrable.

The excised tissue showed a hyperplasia of the bladder epithelium with a thickened submucosa (fig. 6). There was a dense proliferation of the connective tissue which permeated the muscle fibers. In certain areas there appeared degeneration of both the connective and the muscular tissue. Fibroblasts were present, but lymphocytes predominated in the exudate and numerous plasma cells and eosinophils were seen. Throughout the tissue were small areas of calcification which were surrounded by fibrous connective tissue. Immature prostatic glands were present. Qualitative analysis of the removed stones showed calcium carbonate.

Postoperative Course.—During the twenty months since the operation the boy's progress has been good. Dilations of the vesical neck have been carried out, and at present a number 16 catheter passes to the bladder. The residual urine is less than

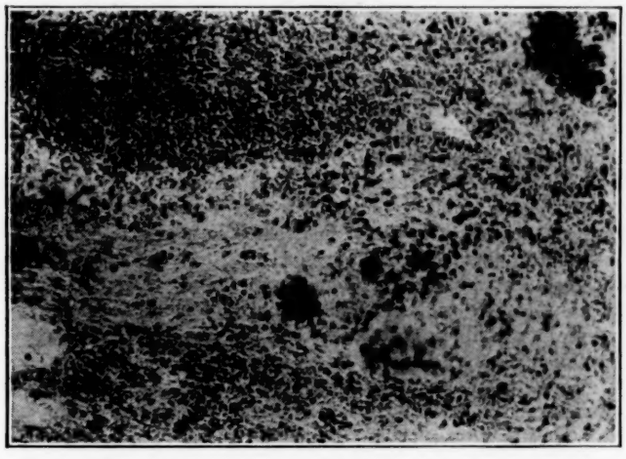

Fig. 6.—Section removed from the vesical neck. There is marked proliferation of the connective tissue with evidence of degeneration. There are also seen small areas of calcium throughout the tissue.

1 ounce (30 cc.), containing some pus and bacteria. The boy has developed daytime control of the urine, is free from pain, and voids about every hour. A roentgenogram of the bladder reveals no evidence of stone.

COMMENT

In a summary of this case it seems important to emphasize that the patient had a neurogenic incontinence, but there are neither roentgenographic nor physical findings to indicate that there was present any large amount of residual urine until calcification developed with bladder neck obstruction. The calcification was an acquired condition and developed between the ages of 8 and 13.

It is concluded that the fibrosis of the vesical sac was a progressive disease and preceded the calcification. The fibrosis does not appear to have been incidental to muscular hypertrophy, since there was no hypertrophy of trigon, bladder wall or the internal sphincter. It may have been initiated by a disturbance of innervation of the sphincter followed by an acquired infection.

The patient gained control of the bowels at the age of 7 and, had not the fibrosis with calcification of the vesical neck occurred, he most likely would have gained some control of the bladder without the aid of surgery.

In the tissue removed from the bladder orifice there was present a dense proliferation of fibrous tissue with

muscle and connective tissue degeneration and deposits of calcium in the submucosa. One is inclined to consider the submucous calcification as a deposition of calcium in degenerative and inflammatory tissue which was preceded by the fibrous infiltration of the vesical neck. The calcification of the submucosa suggests some similarity to that which occurs in Mönckeberg's disease of the blood vessels, in which there is seen atrophy of the muscle elements and calcium deposits.

Similar calcification is also found in areas of tuberculosis that have undergone fatty degeneration, but in this patient there was neither clinical nor pathologic evidence of tuberculosis. The submucous calcification also suggests some similarity to so-called exogenous prostatic calculi. But the boy's prostate was immature and in the section of tissue removed from the vesical neck no calcification was seen in the prostatic tissue. There was found no suggestion of a diverticulum of the prostatic urethra in which the stones might have developed. Parathyroid disease as an etiologic factor in the calcification was considered, but there was no clinical evidence of such a disturbance.

710 Eccles Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. POWERS AND MURRAY AND DR. FISTER

DR. HERBERT B. WRIGHT, Cleveland: The paper presented by Drs. Powers and Murray emphasizes that the eye-ground changes are reversible and do not contraindicate treatment and that the disease must be unilateral to warrant surgical intervention. The proposition of removing the worse of two diseased kidneys in an effort to clear up hypertension is a distinct mistake. This paper adds another good case to the approximately 50 cases in adults and children whose unilateral renal disease was benefited by nephrectomy. One additional case of hypertension in a child is known to me through a personal communication of Dr. Goldblatt. A girl aged 12, a patient of Dr. Williams of Dallas, Texas, had a blood pressure of 260 systolic and 160 diastolic before nephrectomy two and one-half years ago, and ever since the operation she has had entirely normal levels between 120/80 and 110/70. Her case was also classified as a juvenile type of arteriosclerosis with pyelonephritis. Goldblatt feels it is conceivable that a unilateral nonfunctioning kidney in the human may produce hypertension, but proved cases of this sort of unilateral hydronephrosis causing hypertension in man have not been demonstrated clearly. There is a growing lack of respect for the "cold pressor" test as an aid in evaluating these cases. Elevations of blood pressure may be falsely obtained by reason of the excitement of the patient or of the physician. Cold pressor determinations made with the patient and the examiner on one side of a screen and the testing carried out on the other side are said to show results at considerable variance with previous conceptions. In evaluating psychologic factors in these cases of hypertension, the test proposed by Moore and advocated by Goldblatt seems the most valuable. It consists in taking a series of blood pressure readings while the patient is asleep under intravenous anesthesia. It is a simple procedure, easily accomplished and quite valuable. If the case is one of true hypertension there should be no large fall in the blood pressure during the anesthesia. If the blood pressure goes down appreciably and definitely while the patient is under the anesthetic, the surgical treatment of the hypertension should be abandoned because the elevation is largely psychologic. With regard to Dr. Fister's paper, I have looked the literature over carefully, talked to a number of urologists concerning this submucosal bladder neck calcification and agree that this case is probably unique.

DR. MARJORIE F. MURRAY, Cooperstown, N. Y.: In the cases found in the literature, those reported by Pincoffs and Bradley are of especial interest as among the earliest in which hypertension was relieved by an operative procedure. These children and the 1 reported by Koons and Ruch were found to have Wilms's tumor associated with hypertension. Those operated on were relieved temporarily. Koons and Ruch's patient was living at the time of their report. The other cases that were found fall into certain definite groups. First those with hydronephrosis due to obstruction of the urinary tract reported by Bothe. Second, Leadbetter's case of congenital obstruction of the renal artery, in which hypertension was relieved by the removal of an ectopic kidney. Third, the cases reported by Butler, Barney and Suby, Patch, Rhea and Codnere, and Kennedy, Barker and Walters, in which chronic unilateral pyelonephritis was the underlying factor. Not one of these cases has been followed over a sufficiently long period to give one a feeling of assurance that the children will survive. The longest period of postoperative observation is of Bothe's patient, who has been followed for four and one-half years after nephrectomy and still has a normal blood pressure.

DR. GEORGE M. FISTER, Ogden, Utah: This boy was operated on Sept. 12, 1939, and since the operation he has had fair daytime control over urination. He urinates every one and one-half or two hours. Six months ago, the last time I catheterized him, there was about an ounce of residual urine. He still has bed wetting at night.

Clinical Notes, Suggestions and New Instruments

INFECTION OF THE GALLBLADDER BY GIARDIA LAMBLIA

HOWARD R. HARTMAN, M.D., FRANKLIN A. KYSER, M.D.
AND
MANDRED W. COMFORT, M.D.
ROCHESTER, MINN.

The frequency with which Giardia lamblia invades the biliary system and actually gains entrance to the gallbladder is still an unanswered question.

Clinical observations by ourselves and other workers [1] have definitely verified the fact that giardial organisms are often found in the B fraction of bile obtained by the Meltzer-Lyon technic of duodenal drainage. This fact does not prove, however, that the parasites actually do invade the gallbladder. Hollander [2] has pointed out that the hypertonic solution which is introduced into the duodenum to obtain the B fraction of bile causes liberation of fluid into the duodenal lumen and that this fluid may wash the giardial organisms from the deep crypts of the duodenal mucosa into the lumen and thus account for the presence of the parasites in the duodenal aspirate.

Reports of cases in the literature in which giardial parasites have been obtained from bile from the gallbladder at operation are rare. Smithies [3] has reported 2 cases and Westphal and Georgi [4] have reported 1. Calder and Rigdon [5] have reported observations made at necropsy in 1 case in which the organisms were found in the contents of the gallbladder.

We report a case in which giardial organisms were found in the bile from the gallbladder at operation. We do not wish to convey the impression that the parasites were entirely responsible for the patient's symptoms, since the operative findings were extremely significant. We do feel, however, that the finding of the organisms in the gallbladder bile is significant enough in itself to merit publication of this report.

From the Division of Medicine, Mayo Clinic (Drs. Hartman and Comfort). Dr. Kyser is Fellow in Medicine, Mayo Foundation.

1. Boeck, W. C.: Giardiasis in Man: Its Prevalence and Relation to Diarrhea and to Gallbladder Disease, Arch. Int. Med. **39:** 134-158 (Jan.), 1927.

2. Hollander, Edward: Giardia Intestinalis Infection, Arch. Int. Med. **32:** 522-529 (Oct.) 1923.

3. Smithies, Frank: Parasitosis of the Bile Passages and Gallbladder: A Report on Thirty-Seven Instances of Protozoiasis and One Instance of Infestation by Necator Americanus, Am. J. M. Sc. **176:** 225-253 (Aug.) 1928.

4. Westphal, Karl, and Georgi: Ueber die Beziehungen der Lamblia intestinalis zu Erkrankungen der Gallenwege und Leber, München med. Wchnschr. **70:** 1080-1084 (Aug. 17) 1923.

5. Calder, R. M., and Rigdon, R. H.: Giardia Infestation of Gallbladder and Intestinal Tract, Am. J. M. Sc. **190:** 82-88 (July) 1935.

REPORT OF CASE

A white man aged 32, from Pennsylvania, reported to the Mayo Clinic complaining primarily of nocturnal pain in the upper right quadrant of the abdomen. He said that in 1938 he had taken a three months trip through several South American countries. In August 1940 he had been seized with severe pain in the right upper quadrant of the abdomen. This discomfort was relieved by a drink of whisky. Several hours later sharp severe pain had returned in the right upper quadrant and an hour later the patient vomited and then gradually improved. In September 1940 a similar attack occurred and in October 1940 diarrhea developed in which foul watery stools were passed which contained large droplets of fat. The first stool in the morning was usually formed, but all other stools passed during the day (usually two or three after each meal and at bedtime) were liquid. After having had diarrhea for seven days, the patient experienced severe pain in the right upper abdominal quadrant, which developed gradually, reaching maximal intensity in about forty-eight hours. The pain finally required the use of opiates for relief. The patient felt nauseated but did not vomit. After disappearance of the pain, residual soreness across the entire upper part of the abdomen persisted for about three days. The diarrhea disappeared after the first day of pain.

Since this attack in October of 1940 the patient had had almost identical attacks, once each month, until August 1941, at which time he came to the clinic. Occasionally, during an acute episode, fever would occur in which the temperature was as high as 100 F. Only during two or three recent attacks had the pain ever extended, and then only to the region about the right shoulder blade. Occasionally, between attacks, the patient would notice mild aching in the upper right abdominal quadrant, but it was never severe enough to limit his activity.

In April 1941 his physician at home found giardias in the duodenal contents and instituted a course of atabrine dihydrochloride with only temporary relief of symptoms. No follow-up examination of the stools had been made at that time. During the one year of his illness the patient had lost 40 pounds (18 Kg.). He had never been jaundiced and his history prior to the onset of the condition of which he complained was essentially unimportant. Except for the patient's father, who had diabetes mellitus, the family history was not significant.

The patient was well nourished. The blood pressure was 136 systolic and 88 diastolic, expressed in millimeters of mercury. The pulse rate was 78 and the temperature 99 F. The patient's head, mouth and throat, neck, heart and lungs were normal. There was slight tenderness in the right upper quadrant of the abdomen and the liver was palpable 3 cm. below the right costal margin. Rectal examination revealed no abnormality.

Laboratory studies revealed the blood to be normal in number of cells and concentration of hemoglobin, and the reaction to the flocculation test for syphilis was negative. The urine was normal. A roentgenogram of the thorax appeared to be normal. A cholecystogram revealed a nonfunctioning gallbladder. The value for blood sugar (fasting) was 103 mg. per hundred cubic centimeters; for serum amylase, less than 50 units. There was no lipase in the serum. Results of examination of the stool for parasites were unsatisfactory because of the presence of an excessive amount of fat. Analysis of the twenty-four hour fecal output revealed that 14.5 per cent (dried weight) was fat. Examination of the duodenal contents revealed the presence of Giardia lamblia.

A clinical diagnosis of chronic cholecystitis and chronic pancreatitis was made and surgical intervention was advised and permitted. At operation the gallbladder was found to be normal except for a very slight thickening of the wall. There were no adhesions, and the common and cystic ducts appeared to be normal. The gallbladder was aspirated, and giardial parasites were found in the bile. Extensive edema was noted around the head of the pancreas, and a localized mass in the head of this organ appeared grossly to be an adenoma. Because of the marked inflammatory reaction around the pancreas, no additional surgical procedure was carried out except for removal of the appendix.

Except for a mild febrile reaction of several days' duration, the patient's recovery from the operation was uneventful. However, the distress in the right upper abdominal quadrant and loose stool continued. On the patient's dismissal from the hospital on the twenty-fourth postoperative day a course of atabrine, consisting of 0.1 Gm. administered three times a day for five days, was begun. At the end of the third day of this treatment all the patient's abdominal symptoms completely disappeared and his stools were free from the parasite. He was dismissed from the clinic with the knowledge that reinfection with Giardia lamblia might occur and he was advised to have his stools checked at frequent intervals.

COMMENT

Since atabrine is almost specific for Giardia lamblia,[6] it is probable that the first course of this drug did free the patient of the parasites but that he again became reinfected after completing this course of medication.

It is difficult in this case to evaluate what part Giardia lamblia played in causing the patient's symptoms. It is possible that the abnormal condition in the pancreas could account for almost the entire clinical picture. However, since eradication of the parasite completely relieved the patient of all his symptoms, the importance of the presence of Giardia lamblia must not be underemphasized.

HEMATURIA FOLLOWING THE USE OF HEPARIN

EUGENE L. RICHMOND, M.D., WORCESTER, MASS.

Since the recent report of Crafoord and Jorpes [1] of Stockholm, Sweden, the use of heparin prophylactically to prevent the formation of thrombosis has been stimulated and accelerated. They reported the use of more than 30,000 doses of heparin given intravenously in from 50 to 100 mg. doses without fatality and without any apparent drawbacks. They conclude that "evidently the treatment is quite harmless."

The harmlessness of artificially producing a hemorrhagic diathesis by prolonging the coagulation time is not borne out in the case reported here. Massive hematuria with the use of heparin had not been reported previously. Ershler and Blaisdell [2] reported the first occurrence of hematuria in a patient with cavernous sinus thrombosis treated with sulfathiazole and heparin in whom the renal damage was not due to sulfathiazole crystals.

REPORT OF CASE

A girl aged 13 years was admitted to St. Vincent Hospital with a provisional diagnosis of acute appendicitis. For the past three months she had been complaining of irregular pain in the lower part of the abdomen with belching. Two days before entry acute pain developed in the right lower quadrant with nausea and vomiting which persisted to admission. The previous history and the family history were irrelevant and menstruation had not begun.

Examination of the abdomen showed moderate distention with complete rigidity and spasm below the umbilicus. There was considerable tenderness over the entire right side. There was a smooth, tender, globular tumor in the suprapubic region. This mass did not change in size or shape following catheteri-

6. Hartman, H. R., and Kyser, F. A.: Giardiasis and Its Treatment: A Clinical Study, J. A. M. A. **116:** 2835-2839 (June 28) 1941.

1. Crafoord, Clarence, and Jorpes, Erik: Heparin as a Prophylactic Against Thrombosis, J. A. M. A. **116:** 2831-2835 (June 28) 1941.

2. Ershler, Irving, and Blaisdell, Irl: Massive Hematuria Following Use of Heparin in Cavernous Sinus Thrombosis, J. A. M. A. **117:** 927-930 (Sept. 13) 1941.

zation. Rectal examination confirmed the impression that there was a solid tumor arising from the pelvis. Tenderness was exquisite. The temperature was 100.4 F., the pulse rate 100 and the respiratory rate 20. A blood count showed a normal number of red cells and 20,000 white blood cells of which 90 per cent were polymorphonuclear leukocytes.

The preoperative diagnosis was solid ovarian tumor with a twisted pedicle, probably a dermoid cyst.

Operation was immediately performed. There was a large amount of blood tinged fluid in the pelvis. The right ovary was replaced by a large solid tumor 15 cm. in diameter, dark and cyanotic with gangrenous areas at the periphery. There were three complete turns of the tumor on its pedicle. The fallopian tube was gangrenous throughout. A salpingo-oophorectomy was performed.

There was a solid thrombus in the right ovarian vein. The vein was dissected along the entire course of the thrombus, which extended to within 1.5 cm. of its union with the inferior vena cava, and excised. The vein was ligated at this point.

Pathologic examination showed chronic appendicitis, a dermoid cyst of the ovary with acute gangrenous inflammation, acute gangrenous inflammation of the tube and a thrombosed blood clot in a vein.

Owing to the proximity of the ligated end of the ovarian vein to the vena cava and the existing phlebitis, the possibility of an extension of the thrombophlebitic process and the development of pulmonary emboli appeared very real. Consequently, four hours after the operation a continuous intravenous infusion with physiologic solution of sodium chloride and 20 mg. of heparin was started.

The patient passed an uneventful night and when seen the following morning, twelve hours after the operation, seemed in good condition. She had not voided. Four hours later (twelve hours after heparinization was begun) she voided 450 cc. of dark, thick, apparently pure blood. This was accompanied by mild shock. The medication was discontinued at this point at which time 950 cc. of the solution had been absorbed and the coagulation time was seventeen minutes. One and one-half hours later she voided 300 cc. of clotted blood. She went into severe shock, with air hunger and a pulse rate of 160. There was only a slight staining of blood on the abdominal dressing, with no subcutaneous bleeding. While the abdomen was considerably distended and boardlike, there was no bulging or tenderness on rectal examination. The white blood cell count had dropped to 16,000 per cubic millimeter and the red cells to 2,800,000.

An indwelling catheter was inserted into the bladder and hourly irrigations were done to prevent blood clots collecting in the bladder. She was immediately given a transfusion and rallied quite promptly from the shock. Irrigations of the bladder continued to show gross blood for twelve hours after the administration of heparin was stopped. The following day the coagulation time fell to five minutes and there was no further hematuria. After removal of a moderate hematoma at the site of the operation five days later convalescence was uneventful and the patient was discharged on the twentieth postoperative day.

CONCLUSIONS

The intravenous use of heparin produces a prolongation of the clotting time and is effective against the postoperative formation of thrombosis.

The case reported here with its massive renal bleeding would indicate that the treatment is not "harmless," although permanent damage was not done. The clotting time returned to normal when the drug was discontinued, and the hematuria stopped.

It is conceivable that hemorrhage in other areas of the body would cause more serious sequelae.

1026 Slater Building.

Special Articles

THE FIELD OF INDUSTRIAL OPHTHALMOLOGY

A REPORT BY THE COMMITTEE ON INDUSTRIAL OPHTHALMOLOGY OF THE SECTION ON OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION

ALBERT C. SNELL, M.D., ROCHESTER, N. Y., CHAIRMAN; ARTHUR CULLER, M.D., DAYTON, OHIO, AND HEDWIG S. KUHN, M.D., HAMMOND, IND.

The medical profession has always based the main reason for its existence on the trained service which it renders to all who make up our complex citizenship. At this time, when industrial production is important in defense, it is peculiarly fitting that individual members of our profession and its organizations take time to consider whether or not this reason for existence is being satisfactorily fulfilled in all fields. Does this service reach all classes of the population or is there need in some fields for a more realistic distribution of skilled medical services? Do the medical societies and the individual members live in a "sort of economic vacuum untouched by the pressing social and economic issues of the day," as stated in an editorial? [1]

So far as the practice of ophthalmology is related to the needs of industrial workers we find that there is a vacuum—an open gap—between the service which the competent ophthalmologist, restricted to office practice, is prepared to offer and the ophthalmic needs of the ordinary industrial worker who is not brought to this office. This vacuum is due to economic reasons or because of lack of understanding of the need of employees for this service. This gap or vacuum should be eliminated.

Because of the many complex problems that can be visualized by those interested in all phases of industrial ophthalmology and because there is an apparent need for developing a practical program of visual testing and correction to aid industry in the placement of its employees, the Council on Industrial Health of the American Medical Association suggested last year that a committee on industrial ophthalmology be appointed by the Section on Ophthalmology of the American Medical Association and that the Academy of Ophthalmology and Otolaryngology be asked to cooperate by the appointment of a joint committee. This committee has now been appointed and much preliminary work has been done. This paper is a preliminary report of this committee.

In order to present a partial picture of the need of further ophthalmic services to industrial employees attention is called to some aspects of the field of industrial ophthalmology, to the literature apposite to this theme and to an outline of a possible program of service which will meet any special need that may be revealed.

The scope of industrial ophthalmology should encompass the entire field of the visual functions of employees

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

This report is abbreviated in THE JOURNAL by the omission of the bibliography. The complete report appears in the reprints.

1. Bulletin of the Medical Society of the County of Westchester, Sept. 15, 1941.

as these functions relate to industrial production. To illustrate the scope of this broad field, we point out that the field of industrial ophthalmology may conveniently be divided into five separate parts, although all of these are interrelated. These parts are (*a*) the efficient use of vision in industry; (*b*) eye accidents—their prevention and the treatment of injuries; (*c*) conservation of visual health (other than that relating to accidents)—its relation to general health and the relation of general health to efficient vision; (*d*) visual economics—the effect of vision on earning ability and on production, and (*e*) medicolegal ophthalmology—its relation to compensation for eye injuries and to protective insurance, liability and the like. In this preliminary paper we shall discuss at some length only the first of these five topics, since "the efficient use of vision in industry" is the most neglected part of the field of industrial ophthalmology. We shall merely call attention to "eye accidents" and omit all consideration of the three other topics.

The field of eye accidents includes the important program of accident prevention and the proper treatment of eye injuries. Much has been written and much effort is being constantly expended in this field. But let us point out briefly that, although during the past twenty-five years much progress has been made in the field of protecting employees' eyes from industrial eye hazards, nevertheless the average number of eye injuries has not been materially reduced. This may be explained by an increasing number of machine operators and machines. Three hundred thousand compensable eye accidents yearly are still taking place. These do not include trivial accidents such as uncomplicated injuries due to superficial foreign bodies in the cornea or conjunctiva. Ninety per cent of the serious accidents are preventable. There are in the United States 8,000 industrially blind and 80,000 employees blind in one eye due to industrial accidents. Special mention should be made of the importance of conferences between management and ophthalmologists in furtherance of a proper program in the use of protecting goggles, especially a type to be used over or in connection with correcting lenses. This phase of the goggle program has not been developed satisfactorily. Thus the program of the prevention of eye accidents is not working satisfactorily, and continued efforts must be directed constantly to programs of accident prevention.

In a review of the literature relating to the qualities of vision which are essential or important to industrial production, there could be found scarcely any reliable statistics which correlated all the various essential visual functions with efficiency of production in the many different and often complex jobs. In the few isolated surveys which were found, as a rule, these included data on only visual acuity; and visual acuity was usually tested without observance of recognized standards of measurement or of illumination. These surveys generally do not include any correlation between the quality of vision found and the visual requirements for specific types of jobs. There are some exceptions to these statements, among which should be mentioned the following: In England the Industrial Health Research Board and the Industrial Medical Research Council in cooperation with a committee on physiology [2] of vision (the chairman of the latter committee being Sir John J. Parsons) have made a series of surveys giving speical attention to the visual needs of workers in various industries. In the United States comprehensive surveys have been made during the past two years by Prof. Joseph Tiffin of Purdue University and his co-workers [3] and also by Dr. Hedwig S. Kuhn.[4] Some parts of the data of these surveys have been published, but much of the latter data has not been analyzed completely and the important facts have not all been revealed. These data are now being thoroughly analyzed and correlated. For those who desire to undertake a more complete study of the literature bearing on the field of industrial ophthalmology a bibliography is appended in the reprints.

The part of the field of industrial ophthalmology that has been neglected most is that which relates to efficient visual performance. This is an intricate but important part. It includes an understanding of all the visual functional factors that are essential to proper visual performance in every kind of job. The study of visual efficiency includes the following topics:

1. Basic elements of visual performance; the need of standards for essential functions of vision for specific jobs.
2. Methods and technics of testing.
3. Ways and means for correcting visual defects.
4. Placement of employees according to visual qualifications.
5. Health factors that influence vision.
6. Programs of cooperation between management, employees, industrial medical departments and ophthalmologists in establishing practical methods of visual testing, correction and placement.

1. *Basic Elements of Visual Performance.*—That some amount of vision is essential to efficient production is taken for granted, but that all jobs do not require the same quality of vision or of perfection of function is not generally comprehended. For example, color vision is not essential for most jobs but is essential for some. It is nonessential for the typist, saleswoman or common laborer but is essential for the railroad engineer and the textile employee who matches colors. Identical degrees of visual acuity are not demanded for every job (fortunately, since not every employee has perfect standard acuity); also, the powers of visual perception and other functions are not employed at the same distance in all jobs. Many employees use their eyes at a working distance of 14 to 20 inches, while others are employed at unusually short or unusually long distances. Examples of those who work at unusually short distances, often at a distance of 6 to 10 inches, are the loopers in the textile industry, inspectors and employees working on fine mechanical parts; examples of those who use their eyes at unusually long distances are the crane operator and the hoisting engineer. In other occupations both near and distant vision are employed alternately. In some jobs the quick and accurate judgment of distance is a most important function; for example, pressmen and those feeding moving machines. Such jobs demand a high degree of muscle balance and of depth perception.

Only a small proportion of eyes function perfectly. Therefore, it is plain that there is need to use such perfection of various qualities of visual function as can be found or developed, in order that all employees may

2. Weston, H. C., and Adams, S.: Industrial Fatigue Board, Reports 40, 49 and 57, London, His Majesty's Stationery Office, 1928-1929.

3. Tiffin, Joseph, and Rogers, H. B.: The Selection and Training of Inspectors, Personnel, vol. **18**, number 1.

4. Kuhn, H. S.: An Appraisal of Visual Defects in Industry, Tr. Am. Acad. Ophth. 1940, p. 208.

find a useful place in industry. It should be noted that many specific jobs do not require the highest degree of perfection in all the essential functions of vision in order that these jobs may be efficiently performed. Moreover, since there are many common defects in vision which are correctable, it is obvious that industrial efficiency can be augmented by the institution of a program of detection and of correction of visual defects. But after the best correction there will remain many employees whose vision is still not perfect. Two per cent of the male population is color blind. One of us (A. C. S.) has estimated that 400,000 employees in the United States are amblyopic in one eye, the acuity in the poorer eye being less than 20/40. Thus it must be apparent that standards of the various essential qualities of vision must be established for a large variety of specific occupations in order that employees may be placed in jobs consistent with the degree and quality of their vision and that the job selected may be done efficiently. To establish these standards, it will be necessary to classify jobs in broad main groups with listing of jobs under each, based on a determination of the minimum visual requirements for each job classification. Such standards have not been established generally.

The essential factors of vision for which the industrial ophthalmologist must have standards for efficient production are (*a*) visual perception (visual acuity) both for distance and for near, (*b*) muscle coordination—muscle balance both for distant and for near vision, accommodation and convergence, (*c*) stereopsis and depth perception, (*d*) color vision.

To solve the problem of establishing reasonable standards for these functions of vision ophthalmologists should have a first-hand knowledge of the demands which industry makes on vision in all ordinary processes of production and also the special demands made by unusual kinds of employment. This involves a study of occupations. As a corollary to these standards of vision the ophthalmologist must be prepared also to advise proper standards of equipment which are essential for efficient visual performance. For example, he should investigate the most adequate illumination, proper ventilation and suitable chairs. For unusual types of employment, standards to indicate the best correcting lenses which are suitable both to the individual and for the specific job must be considered. The latter point suggests the problem of finding the most suitable occupational lenses for use in special occupations, a subject not generally considered. Thus the problem of establishing acceptable standards which take into consideration all factors that influence the various functions of vision and the specific visual requirements necessary to efficient production, depending on the peculiar nature of specific jobs, is complex. The problem must be solved by fixing standards which, by their employment, will make the most efficient use of all visual functions possessed by employees.

2. *Testing of Visual Functions.*—Satisfactory methods for testing vision are in common daily practice when patients are examined in the offices of ophthalmologists; but the problem of testing vision as it relates to industrial employment centers in the fact that employees, *en masse*, do not and cannot avail themselves of the opportunity of visiting ophthalmologists. Often neither the worker nor the management comprehends the need for an ocular examination, and there is at present no satisfactory and practical method of testing the vision of employees in the various plants.

To be satisfactory, the method must be a simple, uncomplicated one; it must be inexpensive in time and money both for the employer and the employee; it should be done at the plant; it must screen out those who probably have defective vision from those who are visually efficient. A satisfactory method should accomplish the testing without the necessity of complicated equipment, and it should be made by some trained nonmedical person but under the supervision of physicians, preferably by the medical department at the plant. Where this does not exist some medical man should be made responsible for carrying out a predetermined program. There is no substitute for a thorough examination of the eyes in the office when this is indicated, but since surveys show that about 20 per cent of employees have defects which require examination and correction the primary step is that of uncovering those employees who do not need the complete examination. The plants that have a medical department and a competent ophthalmologist on their staff are most fortunate. However, many of the smaller plants have no such organizations, and even in the larger plants visual testing as a rule is not done satisfactorily. The technic which will embody all the desirable factors mentioned is now being developed and checked for dependability, by comparison with other accepted methods of visual testing. We believe that this phase of our problem is well on the way to a satisfactory solution.

3. *Ways and Means of Correcting Visual Defects.*—There seems to be no one way by which the final examination can be made to the satisfaction of all interested parties. Since visual efficiency means productive efficiency which is a saving in cost of production, it would seem that industry should set up an organization to carry out a complete program, from supplying the technician to doing the testing, obtaining an ophthalmologist to determine the proper correcting lenses or treatment and, finally, supplying lenses, when needed, through an optician located at the plant. Such an organization is ideal but not often possible, and other means must be employed. An ophthalmologist on part time or on a fee basis can usually be found who will cooperate with the management in making the necessary final examinations. The glasses can be furnished through a contract with an optician to be paid for either by the management or by the employee. In every industrial plant, large or small, a satisfactory method can be worked out for a complete service. Ways and means for correcting visual defects, including the fitting and supplying of suitable lenses, can be found. When requested, any reliable ophthalmologist will cooperate.

4. *Placement of Employees.*—With the qualities and degrees of visual function of each employee determined and with other data—medical, personal and psychologic—in the hands of placement personnel, the job of placement of each employee can be carried out on a fairer and more scientific basis than can the hit and miss, trial and error method of placement in common use. So far as vision alone is concerned, jobs for all employees should be found which are suitable for the visual function

possessed by the employee. This concept implies an understanding of "jobs for the eyes" and "eyes for specific jobs." Placement of employees with the application of this concept is not universal. If our contemplated program can be developed and adopted, we believe that there will be not only an increase in production efficiency but also an improvement in the health, contentment and happiness of employees.

5. *Health Factors and Vision.*—The state of one's general health directly affects visual health and efficiency and, vice versa, visual health has a direct influence on general health. Space and time do not allow of further elaboration of this statement. It is made here to call attention to the intimate connection between vision and health. Also there are problems of housing, recreation, domestic relations and nutrition which have a bearing on health and which need further consideration. At the present time much investigation is being made to discover the influence that vitamins may have on general health and particularly on visual efficiency, but no satisfactory conclusion has been arrived at.

6. *The Program.*—To carry out a satisfactory program of testing, examining and correcting of visual defects, there must be complete coordination of activities between management, employees, medical departments, ophthalmologists and opticians. When the value of a completely coordinated program is comprehended, the desired cooperation between all interested parties will not be difficult to secure.

The members of the joint committee of the Section on Ophthalmology and the Academy of Ophthalmology and Otolaryngology are making a comprehensive study of all phases of the many details of the problem of the broad field of industrial ophthalmology. In the near future this committee hopes to develop a program which will close the gap between the ophthalmic needs of industrial employees and an adequate service to them.

The program visualizes (1) a further investigation of accident prevention and health factors influencing vision, (2) a study of illumination and other important equipment which are aids to efficient vision, (3) a plan of cooperation with educational institutions by which preoccupational shop training may be suited to the vision of the student or apprentice, (4) a study of rehabilitation possibilities and occupational eye wear, (5) the establishment of standards of vision based on job requirements, (6) the grouping of types of employment which can be followed efficiently with minimum standards of vision and (7) the development of a new technic of examination by nonmedical persons.

CONCLUSIONS

Medical practice in the field of industrial ophthalmology presents peculiar phases distinct from the usual practice of ophthalmology.

The social and economic status of industrial employees should be taken into consideration in planning any program of ophthalmic service.

The Committee on Industrial Ophthalmology is making progress with a program of visual testing and correction which, we hope, will be acceptable to management, to employees and to ophthalmologists.

This program aims to close the existing gap between the industrial workers who need medical care of eye defects and those qualified to render satisfactory ophthalmic service.

INDUSTRIAL DERMATOSES

A REPORT BY THE COMMITTEE ON INDUSTRIAL DERMATOSES OF THE SECTION ON DERMATOLOGY AND SYPHILOLOGY OF THE AMERICAN MEDICAL ASSOCIATION

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In the presentation of this report to the fourth Annual Congress on Industrial Health it seems appropriate to describe in a few words the organization and program of the Committee on Industrial Dermatoses. In the several years preceding 1936 there had been an increasing interest in the cutaneous manifestations arising from occupational exposures, and a need for a central clearing house of information on this subject had become more and more apparent. Therefore, at the meeting of the Section on Dermatology and Syphilology of the American Medical Association in 1936 a committee of five dermatologists interested in the subject was created. Shortly after this meeting a similar committee was formed in the American Dermatological Association and a small sum appropriated for expenses. Having common interest in these diseases due to occupational factors, members of the two committees have jointly carried out the original intent of cooperative consideration of industrial dermatologic problems. They have met and acted annually or oftener at various meetings of national associations.

In the beginning, the committee, through the Section on Dermatology and Syphilology, played a prominent part in the development of the Council on Industrial Health. The creation of the Council marked the attainment of one of the primary objectives of the committee in regard to the establishment of the central clearing house of information mentioned. It had been hoped that a dermatologist would be a member of the Council, in view of the fact that 65 per cent or more of industrial disease concerns the skin. In fact, Dr. Earl D. Osborne of Buffalo was an original member until pressure of other work forced him to give it up.

In 1937 the committee sponsored a symposium on occupational dermatoses at the meeting of the American Medical Association in San Francisco and also at the annual meeting of the American Dermatological Association. The papers presented at these two meetings have been collected and bound in one convenient volume by the American Medical Association in order to make them more readily accessible. At this session a discussion of improved standards of teaching occupational dermatology was initiated, and during the past year a questionnaire on this subject has been sent out to all medical schools in the country. This survey is practically completed, and a report with recommendations will be issued very soon. Discussion was also begun on acceptable definitions of an occupational dermatosis, a primary skin irritant, criteria for diagnosis of an occupational dermatosis and determination of disability.

Since these early discussions there has been steady growth in interest in the subject of cutaneous problems

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in industry, not solely on the part of dermatologists but by industrial physicians and in the general medical profession as well. The reasons for this interest in these problems can be stated as follows:

1. In at least 15 per cent of all patients with cutaneous disease an occupational factor must be considered.
2. Disability due to occupational dermatoses is increasing.
3. Much of this disability could be prevented by early detection and adequate preventive measures.
4. New causal factors are constantly being introduced into the picture.
5. Numerous workers with dermatoses are granted compensation and others are deprived of compensation on inadequate data.
6. Opportunities for well rounded instruction in the subject are scarce.

These immediate problems requiring solution have made it imperative that the committee be continued as a permanent one in order to continue these specific lines of investigation.

The committee has met with the officers of the Council on several occasions. Out of these conferences have developed the industrial dermatoses bulletins, which appeared first on March 1, 1941. These bulletins have served as a most satisfactory medium for exchange of ideas between members of the committee and the Council.

RECENT DEVELOPMENTS

Results of work already accomplished will best be described in the following series of definitions and criteria, which have been thoroughly discussed, agreed on by the full membership of the committees and submitted to the Council on Industrial Health for adoption and publication.

1. *Definition of an Occupational Dermatosis.*—In 1939 the committee adopted the following definition of an occupational dermatosis:

> An occupational dermatosis is a pathological condition of the skin for which occupational exposure can be shown to be a major causal or contributory factor.

2. *Definition of a Primary Skin Irritant.*—When a substance in a given concentration, in a given vehicle and in a given manner and length of exposure produces a clinically manifested irritation on the skin of a majority of persons not previously sensitized to that substance, that substance is a primary irritant under the specified conditions. This irritation may be redness, papulation, vesiculation, ulceration or other sign of damage at the site to which the substance has been applied.

By contrast, substances which produce reactions only on the skin of persons who are hypersensitive to that substance are not primary irritants. A sensitizing agent is one which increases the capacity of the tissue to react to subsequent exposure.

Hypersensitivity means having a greater capacity to react than the norm.

Other circumstances operative in determining the irritant action of a given substance are numerous and complicated and therefore difficult to incorporate in an all inclusive definition. The following may be mentioned: the region of the cutaneous surface exposed; the physiologic state of the skin with reference to dryness, oiliness, perspiration and degree of pigmentation —the skin of the white race contrasted with that of the black, brown and yellow races; the action of two substances in combination, each of which alone does not exert an irritant action; the size of the area exposed to the irritant; whether the area exposed to the irritant is subsequently covered or exposed to air. Still other factors may be operative; for example the general state of health, the emotional background and the influence of season, diet and actinic rays.

3. *Criteria for the Diagnosis of Occupational Dermatoses.*—The Committee on Occupational Dermatoses submits this statement of the criteria for the diagnosis of occupational dermatosis with the purpose of improving the proper interpretation of manifestations on the skin resulting from occupational causes. In so doing, the committee realizes fully the inadvisability, as well as the impossibility, of establishing arbitrary standards for determining the causal relationship between the occupational exposure and the abnormal condition of the skin in every individual case.

The lapse of time between exposure and examination, the inability to obtain an accurate history, the previous treatment, the combination of occupational and nonoccupational cutaneous disease and various other factors prevent the application of any criteria in certain cases. It is also realized that all the suggested criteria will not fit every individual case, that new causal factors will continually be introduced in industrial processes and that new, or at least unusual, manifestations on the skin may be caused by agents in use at the present time. However, a careful weighing of the evidence obtained by detailed history and examination in the light of these standards should aid in the interpretation of the occupational relationship.

In the majority of cases of occupational dermatoses, the following criteria will usually be found to apply:

(*a*) The dermatologic diagnosis is a dermatosis in which the role of an occupational causal (major or contributory) factor has at some previous time been established beyond reasonable doubt.

(*b*) The person has been working in contact with an agent known to have produced similar changes in the skin.

(*c*) The time relationship between exposure to the agent and the onset of the dermatosis is correct for that particular agent and that particular abnormality of the skin.

(*d*) The site of the onset of the cutaneous disease and the site of maximum involvement are consistent with the site of maximum exposure.

(*e*) The lesions present are consistent with those known to have followed the reputed exposure or trauma.

(*f*) The person is employed in an occupation in which similar cases have previously occurred.

(*g*) Some of the person's fellow workers using the same agent are known by the examiner to have similar manifestations due to the same cause.

(*h*) So far as the examiner can ascertain there has been no exposure outside of occupation which can be implicated.

(*i*) If the diagnosis is dermatitis, the following items are important:

(1) Attacks coming after exposure to an agent, followed by improvement and clearing after cessation of exposure, constitute most convincing evidence of the occupational factor as a cause.

(2) The results of patch tests performed and interpreted by competent dermatologists corroborate the history and the examination in the majority of cases.

As previously indicated, these criteria are difficult of application in certain groups of cases: (*a*) cases in which there is sensitization; (*b*) cases in which there is accentuation of existing cutaneous disease by occupational factors; (*c*) cases in which there are supervening

complications of other dermatoses and occupational dermatoses; (*d*) cases in which much time has elapsed between the development of the dermatosis and the examination, and (*e*) cases in which there has been overtreatment.

The committee has voted to adopt these criteria and submit them to the Council on Industrial Health.

PRESENT PROGRAM

The committee is undertaking four separate investigations at the present time:

1. *Teaching of Occupational Dermatoses in Medical Schools.*—Questionnaires have been sent out to all class A medical schools in the United States and Canada and the majority of them have been returned and are being tabulated. On the basis of these questionnaires it will be possible to make appropriate recommendations to professors of dermatology throughout the country regarding improved teaching in this subject.

2. *Primary Skin Irritants and Patch Testing.*—Assistance has been asked from dermatologists and industrial physicians about primary skin irritants and patch testing. The replies are now being studied as a means of evaluating patch testing and the creation of lists of primary skin irritants. As soon as these lists have been completed, individual chemicals will be submitted to members of the committee for testing.

3. *Evaluation of Protective Creams and Detergents Used in Industry.*—The problem of evaluating protective creams and detergents has been presented to the committee, and a subcommittee consisting of Dr. Earl Osborne, Dr. Joseph Klauder and Dr. Marion Sulzberger has been appointed to consider the matter. It is likely that the Council on Pharmacy and Chemistry of the American Medical Association will act as a collaborating agency, since if there is to be any regular appraisal of these substances by an official agency it should be in keeping with the rules of that council.

4. *An Industrial Medical Formulary.*—An industrial medical formulary is planned which will contain, among other things, a series of recommendations which would describe authoritatively the desirable qualifications of products to be used in the prevention or medical management of cutaneous exposures in industry. The availability of such a formulary in industrial dispensaries, it is thought, will aid greatly in the early detection and prevention of unhealthful cutaneous exposures and will prevent the use of agents or substances which might be harmful to the skin. A subcommittee consisting of Drs. Edward A. Oliver, Charles C. Dennie and Harold N. Cole has been appointed to take this matter under consideration.

Another project which is under development is the establishment of machinery for the receipt, proper filing and distribution of case reports on interesting and important cutaneous exposures in industry. This information, according to present plans, will be filed in the office of the Council on Industrial Health in accordance with the original clearing house idea. Proper standards for the presentation, acceptance for filing and publication of these case reports are now being formulated.

The members of the Committee on Occupational Dermatoses are all actively interested in the subject of cutaneous hazards in industry and their local and systemic effects. They pledge their full cooperation with the work of the Council.

RECOGNITION OF EARLY NUTRITIONAL FAILURE IN INFANTS, CHILDREN, ADOLESCENTS AND ADULTS

TENTATIVE CLINICAL CRITERIA FOR PHYSICIANS: COMPLETE LIST OF SYMPTOMS AND SIGNS CLASSIFIED ACCORDING TO PERSONS CAPABLE OF OBSERVING THEM

THE PROBLEM

It is admitted a priori and as the basis for recommendations by this subcommittee that "early nutritional failure"—early deficiency states—is probably far more prevalent among the population of the United States than is generally recognized. Studies in various parts of the country of urban and rural groups strongly suggest that malnutrition is a problem of some social and economic importance in all areas investigated.

Symptoms and Signs Suggestive of Early Deficiency States in Infants and Children

Symptoms		Physical Signs	
1. Lack of appetite	(L)	1. Lack of subcutaneous fat	(N)
2. Failure to eat adequate breakfast	(L)	2. Wrinkling of skin on light stroking	(N)
3. Failure to gain steadily in weight	(L)	3. Poor muscle tone	(D)
4. Late period of sitting, standing, walking	(N)	4. Pallor	(N)
5. Aversion to normal play	(L)	5. Rough skin (toad skin)	(N)
6. Chronic diarrhea	(L)	6. Hemorrhage of newborn (K)	(D)
7. Inability to sit	(L)	7. Bad posture	(L)
8. Pain on sitting and standing	(L)	8. Nasal blackheads and whiteheads	(N)
9. Poor sleeping habits	(L)	9. Sores at angles of mouth, cheilosis	(L)
10. Backwardness in school	(L)	10. Rapid heart	(N)
11. Repeated respiratory infections	(L)	11. Red tongue	(D)
12. Abnormal intolerance of light, photophobia	(L)	12. Square head, wrists enlarged, rib beading	(N)
13. Abnormal discharge of tears	(L)	13. Vincent's angina, thrush	(D)
		14. Serious dental abnormalities	(N)
		15. Corneal and conjunctival changes—slit lamp	(D)

L, those which parents or teachers might observe.
N, those which nutritionists or nurses might observe.
D, those which physicians only would be expected to observe. The physician would take into account all other symptoms whether or not they have been previously observed.

The relation of diet and specific food factors to frank florid deficiency disease has been established, and satisfactory clinical and laboratory criteria for diagnosis have been defined. This aspect of the problem is being satisfactorily studied in a number of areas well scattered geographically. The basic current problem is clearcut: there is imperative need for (*a*) determination of the actual incidence of early deficiencies among the general population and for (*b*) the establishment of satisfactory diagnostic criteria for the recognition of such conditions.

The dietary habits of the people and the staple foods available vary in different sections of the United States. Correlating with this is the fact that investigators working in different areas are not in agreement concerning either the incidence or the interpretation of the indications pointing to nutritional failure. This may be explained by lack of uniformity in the methods for

Additional copies are available from the Nutrition Division, Office of Defense Health and Welfare Services, New Social Security Building, Washington, D. C.

Prepared by the Subcommittee on Medical Nutrition, Division of Medical Sciences, National Research Council. The subcommittee includes Dr. Thomas T. Mackie, chairman; Dr. Joseph S. Wall, 1864 Wyoming Avenue, Washington, D. C.; Dr. Julian Ruffin, Duke University School of Medicine, Durham, N. C.; Dr. Tom D. Spies, Hillman Hospital, Birmingham, Ala.; Dr. V. P. Sydenstricker, professor of medicine, University of Georgia School of Medicine, Augusta, Ga., and, as collaborators, Dr. Norman Jolliffe, New York University School of Medicine, New York, and Dr. W. H. Sebrell, National Institute of Health, Washington, D. C.

identification and classification used by different workers, by local differences in dietary habits and environment or by the two acting concurrently.

Evaluation of the problem is still further complicated by the lack of sufficient, entirely dependable and practicable chemical methods of analysis, by the varying application of presently available methods and by variations of technic in their use.

Despite these difficulties, it is the judgment of this subcommittee that the clinical criteria and objective methods of study presently available are sufficient to warrant much more intensive investigation of early nutritional failure than has as yet been attempted. It is the further judgment of the subcommittee that such intensive investigation, if properly planned and distributed, would yield data of social, economic and public health importance.

Symptoms and Signs Suggestive of Early Deficiency States in Adolescents and Adults

Symptoms		Physical Signs	
1. Lack of appetite	(L)	1. Nasolabial sebaceous plugs	(N)
2. Lassitude and chronic fatigue	(L)	2. Sores at corners of mouth, cheilosis	(L)
3. Loss of weight	(L)	3. Vincent's angina	(D)
4. Lack of mental application	(L)	4. Minimal changes in tongue color or texture	(D)
5. Loss of strength	(L)	5. Red swollen lingual papillae	(D)
6. History of sore mouth or tongue	(L)	6. Glossitis	(D)
7. Chronic diarrhea	(L)	7. Papillary atrophy of tongue	(D)
8. Nervousness and irritability	(L)	8. Stomatitis	(D)
9. Burning, prickling of skin, paresthesias	(L)	9. Spongy, bleeding gums	(L)
10. Night blindness	(N)	10. Muscle tenderness, extremities	(D)
11. Abnormal intolerance of light, photophobia	(L)	11. Poor muscle tone	(D)
12. Burning or itching of eyes	(L)	12. Loss of vibratory sensation	(D)
13. Abnormal discharge of tears, lacrimation	(L)	13. Increase or decrease of tendon reflexes	(D)
14. Muscle and joint pains, muscle cramps	(L)	14. Hyperesthesia of skin	(D)
15. Sore bleeding gums	(L)	15. Bilateral symmetrical dermatitis	(D)
16. Tendency to bleed	(N)	16. Purpura	(D)
		17. Dermatitis; facial butterfly casal necklace, perineal, scrotal, vulval	(D)
		18. Thickening and pigmentation of skin over bony prominences	(D)
		19. Nonspecific vaginitis	(D)
		20. Follicular hyperkeratosis of extensor surfaces of extremities	(D)
		21. Rachitic chest deformity	(D)
		22. Anemia not responding to iron	(D)
		23. Fatigue of accommodation	(D)
		24. Vascularization of cornea	(D)
		25. Conjunctival changes	(D)

Implicit in the definition of the problem and in the foregoing statements is the fact that no symptoms or physical signs can be accepted as diagnostic of early nutritional failure. Certain symptoms and physical signs, however, when verified by a competent physician and when other possible causes have been ruled out should be considered as significant indications.

Owing to differences in training and in the opportunities for observation by parents, teachers, nutritionists, nurses and doctors, the list of symptoms and physical signs have been divided into three groups. The first list includes those signs that might be observed by parents and teachers. The second list covers those symptoms and signs that can be observed by nutritionists and nurses as well as those given in the first list. The third list includes all symptoms and signs that should be observed by doctors as well as by parents, teachers, nutritionists or nurses. In the third, or complete, list, which is presented here, the letter following each symptom indicates the type of person who might be expected to observe that particular symptom.

Council on Pharmacy and Chemistry

REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.

AUSTIN E. SMITH, M.D., Acting Secretary.

ANNUAL MEETING OF THE COUNCIL ON PHARMACY AND CHEMISTRY

The Council on Pharmacy and Chemistry of the American Medical Association convened at the Association headquarters, Oct. 17-18, 1941. Those in attendance were Drs. David Barr, J. Howard Brown, S. W. Clausen, H. N. Cole, Morris Fishbein, E. M. K. Geiling, Theodore G. Klumpp, James P. Leake, Perrin H. Long, George W. McCoy, Stuart Mudd, E. M. Nelson, W. W. Palmer, William C. Rose, Elmer L. Sevringhaus, Torald Sollmann and Soma Weiss. In addition to the members of the headquarters staff there were present, either for certain discussions or during the entire meeting, Dr. Ernest E. Irons, Secretary of the Board of Trustees, Dr. Robert Herwick of the Food and Drug Administration and Dr. Harold Hansen of the American Dental Association.

Among the many items discussed were the following:

Oral Typhoid Vaccine.—For some time the Council has had the subject of oral typhoid vaccine under consideration, although no report has as yet been published. The Council meanwhile has accepted no preparation of this nature. Consideration was again given to the subject and attention was called to recently published material on the subject. The Council authorized preparation of a report on oral typhoid vaccine based on the thesis that its use is not to be recommended.

Omission of Drugs from N. N. R.—The Council considered a list of some twenty-three drugs the retention of which in N. N. R. was questioned. In some cases the Council decided that further evidence was needed to establish whether or not the drug should be retained. In these cases steps were initiated for the obtaining of such data. In the case of the following drugs omission was voted under the regular procedure, namely that, in the case of a class of drugs, they should be retained for the longest period for which any brand stands accepted; in the case of individual brands, until the end of the current period of acceptance. It should be pointed out that the period of acceptance for any product is three years. Under the foregoing conditions the following will be omitted:

1. Sodium Cacodylate.
2. Solarson.
3. Erysipelas and Prodigiosus Toxins.
4. Phlorhizin.
5. Sandalwood Oil Derivatives (accepted brands are Arheol [Astier] and Santyl-Bilhuber-Knoll).

Action was postponed on the following in order that further consideration might be given:

1. Alumnol.
2. Ampuls of Camphor.
3. Cresol.
4. Digestive Enzymes.
5. Scarlet Red.
6. Triethanolamine.
7. Gelatin Compound Phenolized.
8. Liver Extract-Abbott.
9. Parresine.
10. Sodium Thiosulfate.
11. Acriflavine and Acriflavine Hydrochloride.
12. Acetyltannic Acid.
13. Ethylhydrocupreine and the brand Optochin Hydrochloride.
14. Dichloramine-T.
15. Merbaphen.
16. Chlorinated Paraffin.
17. Sulfonethylmethane.
18. Carbromal.

Present Status of Aminophylline.—The Council reviewed the claims for usefulness of aminophylline and decided that a new report should be prepared.

Acceptance of Vitamin B Complex Preparations.—The Council voted to consider for inclusion in N. N. R. the following types of preparations containing mixtures of the components of the vitamin B complex:

1. Mixtures of pure thiamine, riboflavin and nicotinic acid which are provided in the recommended daily intake: 1 mg. of thiamine, 2 mg. of riboflavin, 10 mg. of nicotinic acid or simple multiples thereof.

2. Dry brewers' yeast having the following minimum vitamin content per gram: 0.12 mg. of thiamine, 0.04 mg. of riboflavin and 0.25 mg. of nicotinic acid.

3. A concentrate of the vitamin B complex from brewers' yeast as described under 2, providing in the recommended daily intake 1 mg. of thiamine (or a simple multiple thereof) and corresponding proportions of other known vitamins of yeast.

4. A concentrate of the vitamin B complex from liver containing in each gram not less than 0.25 mg. of riboflavin.

5. A concentrate of the vitamin B complex from brewers' yeast fortified with riboflavin and nicotinic acid and providing in the recommended daily intake 1 mg. of thiamine, 2 mg. of riboflavin and 10 mg. of nicotinic acid or simple multiples thereof.

6. A concentrate of the vitamin B complex from rice polishings fortified with riboflavin and nicotinic acid providing in the recommended daily intake 1 mg. of thiamine, 2 mg. of riboflavin and 10 mg. of nicotinic acid or simple multiples thereof.

Multiple Dosage Forms of Council Accepted Preparations.—During the last year or two there has been a growing tendency on the part of manufacturers to present increasing numbers of dosage forms of certain products, notably the vitamins. The Council discussed this situation and voted that unnecessary multiplication of dosage forms be declared undesirable. It was recommended that, where occasion arises, this should be brought to the notice of the manufacturers, and that, on the basis of information received, recommendation might then be made as to the nonacceptance of superfluous dosage forms.

Large Doses of Vitamin D_2 Preparations in Hypoparathyroidism.—The Council considered the question of accepting preparations representing large doses of vitamin D_2 for treatment of hypoparathyroidism and requested that the evidence be further studied with a view to the preparation of a report.

Nomenclature of Salts of Basic Substances.—With especial reference to the salts of Adrenalin, Suprarenalin, Suprarenin and Novocain, the Council considered the lack of terminologic conformity with the Council's ruling that the name of a product should indicate clearly whether it is marketed as the base or as the salt of the base. For some years the Council has been attempting to persuade manufacturers to conform to this modern principle, with success in the case of some manufacturers and lack of success with others, apparently because of the fear engendered by the somewhat confused status as to what constitute copyrights and trademarks. The Council reaffirmed its ruling and voted to continue its effort toward conformity with the principle represented.

The Scope of New and Nonofficial Remedies.—The value of the section "List of Articles and Brands Accepted by the Council But Not Described" was questioned and the Council decided that a study should be initiated with a view to recommendations of such changes as may be necessary or desirable. The suggestion was made that the drugs in this section should be treated on the same basis as any other drug, whether official or not, and described in the body of the book. After a general discussion of the scope of the book the Council voted that the Chairman appoint a special committee to review the Council's rules and policies and present a report for consideration before the next Council meeting.

Clarification of the Application of the Food, Drug and Cosmetic Act to Labeling Consideration.—The Council voted to adopt the government definition of "label" and "labeling," which is given as follows:

The term "label" means a display of written, printed or graphic matter upon the immediate container of any article.

The term "labeling" means all labels and other written, printed or graphic matter upon any article or any of the containers or wrappers accompanying such article.

Caution Statement for Thiamine Hydrochloride Preparations.—The Council voted to adopt the following revision of the caution statement for thiamine hydrochloride preparations representing a dosage of 3 mg. or more:

CAUTION: FOR THERAPEUTIC USE ONLY. TO BE USED ONLY BY OR ON THE PRESCRIPTION OF A PHYSICIAN.

Solution of Zinc Insulin Crystals and Protamine Zinc Insulin Prepared from Zinc Insulin Crystals.—The Council voted to adopt the name of the U. S. P. Revision Committee for Zinc Insulin Crystals and Solution of Zinc Insulin Crystals.

Pressor (Renin) and Antipressor Kidney Extracts.—The Council voted to initiate action toward preparation and publication of a report on the pathogenesis and treatment of hypertension in the light of present day knowledge. This will call for further investigation, and action will be initiated toward this purpose.

Preservatives.—The Council voted that its interpretation of the term "Preservative" should be redefined to include antioxidants, stabilizers, bacteriostatics and all other substances used for the purpose of maintaining the identity, strength, quality or purity of the preparations.

Progesterone.—The Council voted that a brief report should be prepared on Progesterone, to the effect that the therapeutic indications are not sufficiently well established to justify acceptance of the substance of any brand at this time. The fields of clinical investigation involved will be outlined in the report.

The Hydrates of Sulfathiazole Sodium.—Three different forms of sodium sulfathiazole have been presented for the Council's consideration: the anhydrous, the monohydrated and the sesquihydrated forms. The Council decided that the interested firms should be informed that it appears desirable for the Council to accept only one form of sulfathiazole sodium, unless convincing evidence to the contrary is shown.

"Tocopherol."—The question of nomenclature was discussed. The report which is to be prepared for publication will point out the Council's objection to the name and will indicate that current clinical evidence does not warrant the acceptance of preparations of this substance.

The Value of Gas Bacillus Antitoxin.—The Council voted that for the present Gas Bacillus Antitoxins should be retained in N. N. R. However, the Council will sponsor a statement to the effect that experimental evidence brought to the Council's attention raises a question as to the actual value of such antitoxins as far as the Clostridium septicum (Vibrion septique) component is concerned. This will call for further investigation, and action will be initiated toward this purpose. The Council voted to suggest to the manufacturers of gas bacillus antitoxins the desirability of marketing a preparation containing only the Clostridium perfringens (C. welchi) antitoxin.

Proposed Conference With Representatives of the American Pharmaceutical Association.—The Council voted to postpone action pending further information and arrangements.

The Problem of Rule 11.—The Council voted to omit the "Explanatory Comments to Rule 11" from page 33 of the pamphlet containing the Council's rules as well as from the comments published in New and Nonofficial Remedies. The Council voted that a general statement that the Secretary of the Council will be glad to answer questions with regard to rules and their application be added to the explanatory comments to the rules.

The Status of the Winthrop Chemical Company Under Rule 11.—The Council discussed the problem and reached the conclusion that the current activities and policies of the firm do not conflict with Rule 11.

Contraceptives.—The Council voted to consider contraceptive drugs for acceptance on the same basis as other drugs. The Chairman of the Council on Pharmacy and Chemistry was authorized to appoint a Committee on Contraceptives to consider drugs in this field and make appropriate reports on contraceptive preparations, statements for publication and other matters relating to contraceptives. It was decided that the Council should appoint an Advisory Committee on Contraceptives to consist of outstanding men in the field and that a statement of current Council policy concerning contraceptives should be prepared for publication.

Brochure Problem.—The Council reaffirmed its policy with regard to consideration of advertising brochures. This policy might be stated as follows:

The Council will continue to examine labeling and reasonably brief advertising brochures in the light of permissible claims. The Council does not possess the facilities for adequate and detailed examination of onerously voluminous brochure material. In such cases the responsibility for any claims made must be accepted by the firm, which, by reason of the acceptance of its product, is bound to limit its claims to those sanctioned by the Council.

Statement of Animal Sources.—The Council recently adopted the principle that the source of animal products must be stated on the label in case there is a reasonable possibility that their use may precipitate allergic reaction. This was defined as applying to noncrystalline products for parenteral use and to vegetable oil vehicles of parenterally injected preparations. The Council discussed this problem with manufacturers' representatives and voted that the ruling concerning exact designation of animal sources of products be not applied to accepted brands of insulin. However, it was decided that the N. N. R. descriptions of accepted products should state explicitly the animal source. The Council authorized the obtaining of information as to the incidence of allergic reactions from the injection of the various types of insulin and as to how far those appear to be related to the particular animal source or sources of the insulin. Official publication of the Council's general ruling will be made, and manufacturers will be given a reasonable time in which to comply.

Stilbestrol vs. Diethylstilbestrol.—The Council voted to authorize publication of a report designating the term "Stilbestrol" as the common, nonproprietary designation for 4:4'-dihydroxystilbene, and the name "Diethylstilbestrol" as the common nonproprietary designation for the diethyl derivative, 4:4'-dihydroxy alpha:beta-diethylstilbene. This report was subsequently published (THE JOURNAL, Nov. 8, 1941, p. 1625). In addition the Council decided that for the period of one year (dating from this publication) no objection will be made to the labeling statement "Diethylstilbestrol, also known as Stilbestrol."

Council on Foods and Nutrition and the Council on Industrial Health

BECAUSE OF THE MANY REQUESTS WHICH HAVE BEEN ADDRESSED TO THE COUNCIL OFFICES REGARDING THE ADVISABILITY OF ADMINISTERING VITAMIN PREPARATIONS TO WORKERS IN INDUSTRY, AND BECAUSE OF THE PRESSURE WHICH HAS BEEN APPLIED TO EMPLOYERS BY GROUPS INTERESTED IN THE SALE OF VITAMIN PREPARATIONS, THE COUNCIL ON FOODS AND NUTRITION AND THE COUNCIL ON INDUSTRIAL HEALTH APPOINTED A COOPERATIVE COMMITTEE CONSISTING OF MEMBERS OF BOTH COUNCILS TO REVIEW EXISTING EVIDENCE CONCERNING THE VALUE OF THE ADMINISTRATION OF VITAMINS TO WORKERS IN INDUSTRY AND TO PREPARE A REPORT ON THIS SUBJECT. THIS COMMITTEE CONSISTED OF DRS. LEROY U. GARDNER, LEVERETT D. BRISTOL, AND CLARENCE D. SELBY OF THE COUNCIL ON INDUSTRIAL HEALTH AND DRS. GEORGE R. COWGILL, JAMES S. MCLESTER, AND RUSSELL M. WILDER OF THE COUNCIL ON FOODS AND NUTRITION.

THE FOLLOWING REPORT HAS BEEN PREPARED BY THIS COMMITTEE AND HAS BEEN AUTHORIZED FOR PUBLICATION AFTER CONSIDERATION BY BOTH COUNCILS.

FRANKLIN C. BING, Secretary,
COUNCIL ON FOODS AND NUTRITION.
CARL M. PETERSON, M.D., Secretary,
COUNCIL ON INDUSTRIAL HEALTH.

INDISCRIMINATE ADMINISTRATION OF VITAMINS TO WORKERS IN INDUSTRY

While recognizing the great significance of vitamins to human nutrition and the importance of preparations of vitamins when properly used, the Council on Foods and Nutrition and the Council on Industrial Health of the American Medical Association disapprove of the mass, indiscriminate administration of vitamins to industrial employees for the following reasons: It is irrational from the therapeutic point of view and therefore has no place in a program aimed at securing industrial health. It is unwise nutritionally because special vitamin preparations cannot take the place of valuable natural foods in achieving the completely satisfactory nutritive state. Finally, because a good diet can provide all that vitamin preparations have to offer and more in this connection, the practice of mass administration of vitamins is uneconomical. An extended discussion of the evidence and reasons leading to these conclusions is presented herewith.

The application of discoveries in preventive medicine and public health to the situations prevailing in industry has in considerable measure kept pace with the developments in these sciences. Some discoveries have had prompt general application; concerning others there has been a considerable lag. It is generally recognized that the employer should provide hygienic surroundings, proper sanitary facilities, and machine guards and the like to decrease accidents. The importance of reducing wherever possible the degree of exposure to poisonous fumes, special chemicals that are harmful in any respect, and other substances to be encountered in industry is widely appreciated. The discovery that the muscle cramps occurring in men working in a hot humid environment with its consequent profuse sweating are due to the loss of electrolytes from the body by way of the sweat has led to the practice of providing sodium chloride to the workers in the industries involved. Some managements have even yielded to sales propaganda and administered cold vaccines to industrial employees in an attempt to reduce absenteeism, particularly in the winter months. It is not surprising, therefore, that there should now be much interest in the question whether vitamins should be administered to industrial workers.

DIETARY DEFICIENCIES

Recent discoveries in the science of nutrition, especially with respect to these dietary essentials, have attracted wide attention. There has been a growing appreciation of the existence of what some have called a "subnutritive" state, by which is meant a moderate degree of dietary deficiency of some sort. Various estimates have been made of the extent to which this exists in the general population. These estimates have been based on dietary studies, and as a rule the diets of the working members of the families are not dealt with individually. Nevertheless it is often assumed that the same incidence prevails among the industrial workers as in the general population. During the condition of national emergency which for a long time has involved activities carried on under a slogan of preparedness, the need for optimal nutrition of the industrial worker has been emphasized and the idea stressed in many quarters that this necessarily means giving vitamins to the employees. The change of our national situation from one of preparedness to all out war effort will doubtless lead to further emphasis on this idea in many quarters. It is pertinent, therefore, to give this proposal a critical examination. Students of nutrition at once recognize in this idea not merely the question whether any vitamins as such should be given but another question as well, namely that concerning the source of the vitamins to be given if indeed they should be provided, whether this is in the form of pills, capsules and the like or recognized valuable natural foods.

PROPER NUTRITION

The National Nutrition Conference for Defense held in Washington, D. C., during May 1941, in its consideration of nutritional problems facing the nation, gave attention to the question of proper nutrition of the industrial worker. The recommendations of the conference on this subject might be summarized in the statement that so little is known about workers' diets

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

and so scanty is the evidence concerning the amount and kind of nutritional deficiencies prevailing among them that the primary task is to obtain such information by the use of rigidly controlled studies. The conference also recommended supplemental feeding in factories wherever it was found that workers' diets fell below the modern standard of adequacy. No suggestion was made that the pure vitamins or concentrates of them should be used; the whole emphasis was on the use of natural foods to bring up inadequate diets to the required level.

The Committee on Nutrition in Industry of the Food and Nutrition Board of the National Research Council has given this general question more detailed consideration. Because of the paucity of information available, this committee decided to make such a survey as was possible during the three summer months of 1941. This survey revealed that there was much room for improvement in the feeding of the men in plants that undertake to provide food of any kind. It was found that little attention has been paid to the kinds of foods served in the cafeterias from the point of view of modern nutrition. A qualified nutritionist who classified seven hundred lunch trays passing through tne cafeteria line of a New England plant considered three hundred and ninety of them inadequate and three hundred and ten of them good. Similar conditions were found in other plants. Yet in some of these very plants where feeding facilities had already been established, consideration was being given the idea of indiscriminate administration of vitamins to all employees with no examination of the question whether the existing plant facilities for feeding employees were doing what might be expected of them; whether the foods made available through these facilities were as well selected as they might be in the light of modern nutritional knowledge. In one establishment the management had arranged for lunches to be provided by a concessionaire but apparently had given no attention to the nutritive value of the food so provided. Other instances might be cited supporting the point that much can still be done to improve the nutrition of the industrial worker through careful examination of present facilities to see that they are most effectively used; and if this is done the need for any administration of vitamins as such should be comparatively rare and the result of very special circumstances instead of the rule as advocates of this plan would have us believe.

EXPLOITATION OF VITAMINS

The possibilities of sale of vitamins resident in action of this sort by industrial concerns are being exploited in many quarters. Several companies have been formed for the express purpose of promoting this to industry. It is obvious that such a program should have a firm basis in scientific fact before being widely adopted by industry. Commercial possibilities do not constitute a sufficient basis for advocacy of such a program by the medical profession or scientists generally. Some of the literature prepared by firms exploiting these possibilities is attractive and undoubtedly has a great appeal to the busy industrial executive who must deal with it. All the arts of salesmanship seem to have been drawn on in the preparation of it, and the general impression created is that the proposals of the salesman have a firm scientific basis, an impression which does not stand careful analysis by competent students of nutrition.

One of the claims advanced centers around the idea of insuring industrial production through what is called "vitamin health control" illustrated by the statement "it is wiser to fortify the rations of employees with required vitamins than allow them to work undernourished." Physicians are of course aware that many factors are required to prevent undernourishment, that vitamins are only a few of those needed.[1] A detailed list of these many factors totals approximately forty, and of course all of them are readily secured from a good diet of natural foods. Calories are particularly important, and the number of calories required by workers varies directly with the amount of muscular effort expended. No amounts of vitamins and essential mineral nutrients can obviate this need for energy. Furthermore, if wholesome natural foods are used as the source of the needed calories the required vitamins and minerals will be secured automatically because they are contained in these natural foods.

A considerable part of the supposedly scientific support advanced for this promotional effort consists almost invariably of compendiums of quotations from various sources, addresses of leaders in nutrition, extracts from their published papers and the like, all such material being reprinted without any regard for the original context in relation to which the statement had a definite and appropriate meaning appreciated by the reader. In its new environment the quotation is given an implication never intended by its author, and this implication is emphasized with all the force that the art of salesmanship can muster. The next "proof" with which the business executive is confronted in this sales effort is of the testimonial type. Certain concerns are mentioned as having tried out the practice of supplying vitamins to their employees with alleged successful results. Concerning this the thoughtful student of the problem is led to ask Where are the data yielded by such tests? So far as the Council on Foods and Nutrition is aware they have not been published, nor have they been summarized in memorandums of any kind and made available for disinterested study by competent persons. It is pertinent to point out here that the proper planning and execution of such tests are matters requiring the services of qualified scientists who are familiar with the need for making suitable control observations before conclusions are drawn. The subject is so important nutritionally, medically and economically that the conclusions should not be based merely on general impressions of business executives and other members of the scientific laity. The Council on Foods and Nutrition has always had as one of its guiding principles, to be applied when passing on claims advanced for foods, that there be suitable scientific evidence in support of the claims made. Too often it has turned out that such evidence is not at hand, but rather a body of information of the vague sort illustrated by the statement "we get good reports from doctors and others." Essentially this same situation appears to prevail with respect to this question of the value of an indiscriminate administration of vitamins to industrial workers by their employers. At the present time there is no body of scientific information on which to base the recommendation that industry as a whole adopt this practice.

ADEQUACY OF DIETARIES

Much of the evidence cited in support of this policy concerns the question of the adequacy of the various dietaries characteristic of the people of the United

1. Booher, Lela E.: Adequate Nutrition for the Industrial Worker, J. A. M. A. **114:** 548 (Feb. 17) 1940.

States. Students of this problem recognize that the dietaries representative of certain sections of the country are probably quite inadequate in contrast to those in use elsewhere. It was appreciation of this fact that led the Committee on Nutrition in Industry of the National Research Council to conclude that any careful scientific investigation of this question should involve tests made, if possible, in at least four sections of the country. Those who are promoting the idea that commercial concerns provide vitamins to their employees have as yet given no indication that they appreciate this fact about degrees of adequacies of diets in different sections of the nation. The closest approach to this that can be cited is seen in the offer of one firm exploiting this program which reads as follows: "A choice of proven formulas is available, or special combinations to meet unusual situations may be worked out." Even when the general character of the diets used in a given section is known, one cannot be sure that this represents the diet which the worker receives; McHenry and his associates [2] in their study of the diets of families in Toronto, Canada, observed that the worker was likely to get a better diet than any other member of the family.

It appears obvious that, broadly speaking, the dietaries of the industrial workers in a given section of the country will reflect in part the general situation prevailing in the population of that area and in part the food habits characteristic of the racial and other background of the individuals in question. Consideration of this must lead to the conclusions (*a*) that on the basis of present knowledge broad generalizations concerning inadequacies of the diets of industrial workers are quite unjustified and (*b*) that the decision to give vitamins to industrial workers should depend on the results of careful study of each particular situation with respect to the dietaries of the employees in question and all other pertinent circumstances.

Concerns that are interested enough in this problem to consider spending large sums of money just to buy vitamin pills for their employees could render a valuable service to their industry and section of the country if they would use this money to support research on this question in their plants. Such studies should include the collection of carefully controlled observations and publication of the findings under proper scientific auspices so as to permit independent appraisal of the results. The appropriate limitations to the generalizations arrived at would be evident in the published report. In making such studies these concerns would soon learn that our present technics for revealing the presence of moderate vitamin deficiencies in their employees are in need of development. This subject constitutes one of the important fields of research now being cultivated. A program of indiscriminate administration of vitamins to employees means, of course, giving the vitamins to people who are apparently normal. Therefore any deficiency that is being so treated (?) is of the moderate or subclinical type; proof of the existence of such a deficiency is difficult.

Numerous suggestions can be offered of constructive action that business executives might take now in relation to this question pending the completion of the researches just mentioned. Industrial plants might assist more than they do in the educational work that must be done. They might be used for the display of posters and the distribution of literature that teach how to select a good diet. Organizations of employees could well be enlisted in a campaign to educate the individual workers in such matters and through them their wives who select the food served in their homes; through them the wives could be encouraged to attend the various nutrition classes that are being established in the communities throughout the land as part of the national drive on nutrition in relation to defense. The use in the plant of slot machines that dispense bottles of milk could be studied to determine its value for the plant in question. Nutrition committees have been established in the various states and many of their political subdivisions, and their work integrated with that of the State Defense Council. Through these committees the management of any plant may readily secure advice and assistance in improving the general nutrition of the workers. Many organizations representative of various parts of the food industry, the National Dairy Council to mention but one example, have a valuable contribution to make through their posters and other material prepared for use in the broad educational work concerning nutrition. Through the various nutrition committees this material, as well as that emanating from federal agencies such as the Bureau of Home Economics, Children's Bureau, National Institute of Health, National Red Cross and numerous state agencies that might be cited can be secured. There is now an Assistant Director of Defense, Health and Welfare, whose duties include the dissemination of information on nutrition. This office is located in the Federal Security Agency, Washington, D. C., and is at present under the direction of Mr. M. L. Wilson. Information about all of the government agencies disseminating information relating to nutrition may be secured from this office. Industry might well make use of these resources.

SPECIAL NEEDS IN PARTICULAR INDUSTRIES

It will doubtless be argued in certain quarters that in particular industries the workers may have a greater requirement for one or more vitamins because of the conditions of the employment. Certain distributors of vitamin preparations have been advocating the administration of vitamin C as a prophylactic measure against poisoning by metals, organic solvents, aniline derivatives, phenol, cyanides and so on. The scientific evidence offered at this time in support of such a practice is unsatisfactory. In view of this, such a practice must be regarded as purely experimental and not allowed to create in the mind of the employer as well as employee a false sense of security, thus contributing to the lax application of other obviously proper safety measures.

CONTROLLED STUDIES

There have been a number of investigations in this field where an attempt was made to conduct the experiments with proper controls. Holmes, Pigott, Sawyer and Comstock [3] thus studied the possible value of the administration of cod liver oil for reducing industrial absenteeism due to colds and related respiratory diseases. Wise and Schettler [4] investigated the efficiency in color matching by employees who had rated as below the optimum in vitamin A by biophotometer tests and were then given carotene. Schettler, Bisbee and Good-

2. Patterson, J. M., and McHenry, E. W.: A Dietary Investigation in Toronto Families Having Annual Incomes Between $1,500 and $2,400, Canad. Pub. Health J. **32**: 251 (May) 1941.

3. Holmes, A. D.; Pigott, Madeline G.; Sawyer, W. A., and Comstock, Laura: Cod Liver Oil: A Five Year Study of Its Value for Reducing Industrial Absenteeism Caused by Colds and Respiratory Diseases, Industrial Med. **5**: 359 (July) 1936.

4. Wise, R. C., and Schettler, O. H.: Report on the Use of the Biophotometer and Vitamin A Therapy in Industry, Ohio State M. J. **34**: 666 (June) 1938.

enough [5] have studied the effect of the administration of vitamin A on retinal fatigue. While the evidence regarding the value of the administration of vitamin A in the reports cited is considered too meager to justify claims for the vitamins, these studies stand out as examples of the kind of work that needs to be done in order to ascertain the facts.

In considering these particular studies it should be remembered that an examination of some sort was first made of these employees and then the effect of administration of a vitamin was tested. With data of this sort available, administration of large amounts of the appropriate vitamin for a given period is quite proper in order to bring the employee to the optimal state, after which the use of a good diet is all that is necessary. As another example it might be contended that difficult muscular effort with consequent greater combustion of carbohydrate should lead to a greater requirement for thiamine (vitamin B_1). Here again, however, one is dealing with a matter that is amenable to scientific test and which, therefore, should be subjected to such tests before being considered as settled. Such evidence as has been secured in relation to this particular question of muscular fatigue, however, does not support the idea that vitamin administration is of value to young, healthy men subsisting on an adequate diet. For example, Keys and Henschel [6] at the University of Minnesota have carefully tested the value of supplementing a good U. S. Army ration with liberal amounts of available vitamins. The tests involved measurements of muscular performance on a treadmill carrying a heavy pack, time required for recovery from fatigue, study of heart action and related physiologic processes. Tests were made during periods when the men were subsisting on the army ration alone and again when receiving the diet together with an additional supply of vitamins. Furthermore, the foods actually eaten were recorded and the adequacy of the ration itself was determined. It was concluded that supplementation of an adequate diet with additional amounts of vitamins serves no useful purpose. Students of nutrition would doubtless anticipate such a result.

DIET AND FATIGUE

This question of the relation of dietary factors to fatigue and industrial efficiency has other important aspects that are in no way covered by indiscriminate administration of vitamins to all employees. On the basis of their controlled observations of muscular efficiency measured by the performance of manual tasks, Haggard and Greenberg [7] believe that industrial efficiency accompanied by a subjective feeling of well-being and vigor is affected by the so-called hunger contractions of the empty stomach and the concentration of circulating blood sugar; and these factors are related in an important way to the frequency of meals. More recently these authors [8] have reemphasized the importance of between-meal feedings in industry and pointed out the necessity for providing "both minerals and vitamins in addition to at least 30 Gm. of carbohydrate." The blanket administration of vitamins to employees does not solve this problem, whereas the opposite is true when an extra supply of wholesome food is given. Extra meals consist of appropriate natural foods, and vitamins needed for the metabolism of this extra food energy will be provided automatically in those foods. The so-called Oslo breakfast,[9] which has been used so successfully in Norway and again in England,[10] is just this type of meal, being made up of various protective foods rich not only in vitamins but in other important nutrients as well.

INDIVIDUAL NEEDS

At least one concern has followed the practice of providing vitamins to employees (or assisting in this) when the employee's private physician expresses the opinion that this person may be in need of vitamins. In such a situation, obviously, the employee has gone to the trouble to consult his doctor for some reason, and vitamins have come into the picture as a result of that consultation. This situation is, of course, quite different from that of blanket indiscriminate distribution of vitamins by the concern to all its employees, the question under discussion.

EXPERIENCE IN FOREIGN COUNTRIES

The importance of the use of natural foods rather than vitamin pills in solving any dietary inadequacies of industrial workers is both illustrated and emphasized by the experience of Norway and England. Mention has already been made of the Oslo breakfast. Mr. Bevin, minister of labor in Great Britain, has ruled that all factories employing two hundred or more men must set up canteens to provide the workers with one good meal each day. The minister of health and other authorities in Great Britain have viewed with disfavor every attempt to dispense vitamins to workers. The significance of this attitude will be more readily appreciated when it is remembered that food is rationed in the British Isles and protective foods are scarce. If, under these conditions, it is preferable to supply the workers with good natural foods rather than with vitamins, there seems to be no basis for indiscriminate administration of vitamins to workers in this country.

CONCLUSION

In view of the foregoing discussion, the Council on Foods and Nutrition and the Council on Industrial Health conclude that satisfactory evidence of the wisdom of the general practice of industrial concerns providing all of their employees with vitamins indiscriminately is lacking; the Councils cannot give their support to the program of which this is the objective. When a satisfactory study of any given industrial situation indicates the wisdom of providing vitamins to employees, the Councils wish to point out the necessity for observing the proper scientific limitations of such action to the situation in question; after the employee has been restored to a good nutritive state, the use of a good diet of natural protective foods thereafter should then suffice. Nothing in this report is intended to belittle the significance of vitamins in nutrition, or the value of the proper use of added vitamins in improving staple foods such as bread and flour. What is being emphasized is the need for the avoidance of indiscriminate mass use of vitamins, a practice which supports the commercial exploitation rather than scientific rational use of these important dietary factors.

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THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, FEBRUARY 21, 1942

INDUSTRIAL MEDICAL MOBILIZATION

Wartime industrial medical personnel are needed in three principal fields: (1) the government services, (2) governmentally owned but privately operated ordnance works and (3) private plants with war contracts. Requirements for medical personnel in the government plants center mainly in the U. S. Public Health Service, in state and local bureaus of industrial hygiene and in the arsenals and shipyards operated by the Army and Navy. These agencies have already expanded ordinary facilities through selection and training of eligible candidates. Among other agencies responsible for production of war material the demand for medical service, although acute in some localities, is developing much more slowly. This is not to be construed as lack of interest in the physical welfare of workers on the production lines. Under the pressure of events neither employers nor physicians yet fully comprehend how vast a contribution could be made to the war effort by a well organized industrial health program. A reduction of 10 per cent in the four hundred million man days now lost annually from illness and injury in industry represents the time required to build five capital ships, sixteen thousand tanks or nine thousand bombers.

Medical organizations, in company with trade and manufacturing associations, are beginning to undertake the dual obligation of educating industry to the benefits of modern industrial health and developing physicians able to respond to this created demand for medical supervision. The process must be accelerated lest some form of compulsory medical supervision be imposed on industry, as has already occurred in England. The ability to bring the physician into the plant under terms agreeable to industry, to the worker and to medicine will be enhanced if suitable education and promotion can be developed.

If a substantial demand is created, much will depend on the ability of the Procurement and Assignment Service to avoid the dislocation of the existing supply of competent industrial physicians who are doing an essential job of keeping indispensable men at work. A physician under 45 who is physically fit and who wishes to remain in his industrial position would need to be certified as absolutely essential to industry by the industrial establishment which employs him. Industrial physicians in the 45 to 60 age groups might be dislocated if certain specialist classifications should be called. In the over 60 group, dislocation is considered unlikely. New medical personnel for industry will be located and assigned under advice from corps area, state and county referees, with the assistance of the Procurement Board's Advisory Committee on Industrial Health and Medicine. As substitutes for eligible and replaceable industrial physicians, principal reliance will no doubt be placed on physically unfit male physicians under 45, male physicians over 45, women physicians and qualified laboratory or technical personnel whose employment in appropriate work would release an otherwise essential physician.

The Council on Industrial Health of the American Medical Association can implement these plans by acting as a center to which industry may apply for medical personnel. Steps are now being taken to acquaint the principal trade associations, government agencies and business publications of this arrangement. The medical requirements of private industry ought to be met locally whenever possible, especially if only part time service is required. If such an arrangement is not possible, conservation of medical talent would suggest joint coverage of a number of small plants by the same industrial physician.

POSTGRADUATE EDUCATION IN INDUSTRIAL HEALTH

A successful series of educational institutes on industrial health was sponsored recently by the Committee on Industrial Health and the speakers' bureau of the Iowa State Medical Society in cooperation with the Iowa State Department of Health. Each institute was sponsored locally by the county medical society, the president or secretary acting as chairman of local arrangements. The purpose of these institutes was to stimulate and correlate the interest in industrial medicine of the general practitioner, the industrial physician and the manager of industry.

The plan and purpose of the institutes were approved by the U. S. Public Health Service, and the necessary budget was granted from funds provided by title VI, Social Security Act. A per diem of $50 was allowed speakers outside the state and $25 for those living in Iowa, with travel expense additional. The total budget expenditure for speakers, printing, postage and inci-

dentals averaged $250 for each institute, including the expense of collecting all lectures or abstracts in booklet form for distribution. Publicity was built up carefully and systematically. Thirty days preceding each institute the city chosen was visited by the industrial engineer and the medical director of industrial hygiene in the state health department for a conference with the officers of the county medical society and leading industry. The editor of the local newspaper was visited to enlist his interest. Two weeks preceding the institute, letters outlining the program were sent to all licensed physicians and leading industrialists in the eight or ten counties contiguous to the city in which the meeting was to be held. If held in one of the border towns, special letters were sent to physicians residing in the adjacent states. Shortly thereafter a complete program was sent, accompanied by instructions regarding special features and enclosing a return addressed postal card on which the recipient indicated his intent to attend. Three days before the scheduled date a reminder post card was sent out. All publicity material was prepared by the division of health education in the state department of health and mailed from the speakers' bureau of the state medical society. Appropriate press notices were released at proper times.

A typical industrial medicine institute included a lecture introducing the subject of industrial hygiene with particular reference to its employment by practicing physicians, a demonstration of apparatus and methods used in making an industrial hygiene survey, a comprehensive discussion of occupational diseases keyed to the existing status in Iowa, a delineation of plans for the control of syphilis in industry, a lecture on the surgical management of industrial injuries, and usually a paper on back injuries. Specific instruction was also supplied about the general field of medical relationships in industry and the part which the practicing physician could play as logical adviser to industrial management in the organization of a medical department on either a full time or a part time basis. The medicolegal phases of industrial health were illustrated mainly through reference to the silicosis and industrial dermatitis problems. Each institute was also addressed by a leading industrialist in the community as an expression of managements' interest in the maintenance and improvement of the health, comfort, security and efficiency of employees. The closing exercise of each institute consisted of a panel or round table discussion.

About twelve hundred physicians attended these nine institutes. This type of postgraduate education in industrial health is a proper function of state medical society committees on industrial health in cooperation with state departments of health. The need is evident and the effort, as shown by the experience in Iowa, is distinctly worth while.

VITAMINS AND INDUSTRIAL WORKERS

Vitamins for defense and vitamins for victory are popular themes of the day. Factories and offices seem to be bearing the brunt of the campaign. Company officials have been bombarded with pamphlets and advertising matter describing the need for improving the diet and offering preparations of vitamins, and sometimes of minerals, to help overcome all possible deficiencies. Sometimes an offer is made to concoct special formulas to suit the special requirements of the industry. Attempts are made to create the impression that an employer ought to contribute to national defense and the all out victory effort by distributing vitamin pills to every employee. He is promised increased efficiency of the workmen, and a decrease in absenteeism. Moreover the employer, it is suggested, will have the glow that comes to one who has performed a beneficent act.

Doubtless many physicians, especially those engaged in industrial medicine, have been confronted with the problem of passing judgment on whether or not vitamin preparations ought to be administered to all employees of industrial establishments. This means, of course, persons in apparently good health. The joint opinion of the Council on Industrial Health and the Council on Foods and Nutrition is presented elsewhere in this issue.[1] The Councils believe that the indiscriminate administration of vitamins to industrial workers is irrational from the therapeutic point of view, unwise from the nutritional point of view and uneconomical.

The Councils have offered a number of positive suggestions for the consideration of those industries in which the employers, in good faith, have tried to improve the health of employees by jumping on the vitamin bandwagon. First, the Councils indicate that more research on the nutritional requirements of industrial workers be subsidized by the industry, provided it can be conducted by properly qualified investigators. The suggestion is also made that steps be undertaken to provide better lunchroom facilities and improved hygienic environment for all workers. These matters take time.

Today industrial plants may help to disseminate accurate educational material about foods and nutrition. This would provide information to the working men; moreover, the material could be taken home to the womenfolk, who are the persons most concerned in the buying and preparation of foods. Some progressive organizations already are developing or have developed suitable educational material for such purposes. The National Dairy Council and the American Meat Institute, among other organizations, have charts and pamphlets that have been approved by the Council on

1. Indiscriminate Administration of Vitamins to Workers in Industry, this issue, p. 618.

Foods and Nutrition. Governmental agencies also offer many leaflets. A single thoroughly developed guide is much needed.

The report of the Councils will be disappointing only to those who have hoped that a panacea might reside in small capsules easily swallowed between meals. Improvement in the nutritional status of a nation can come only by means of sound education under the guidance of medical scientists leading primarily to the promotion of food rather than the taking of pills and capsules.

MORALE

A bulletin just issued by the Association for the Advancement of Psychoanalysis calls attention to the increased discussion of the so-called war of nerves, or psychologic warfare. Modern warfare is discussed in terms of chemical warfare, psychologic warfare and even biologic warfare. Thus has civilization advanced! Perhaps it is a part of the German psychologic warfare to promote the belief that their propagandists have devised irresistible and psychologic weapons and strategems with which the morale of opposing nations is led into helpless submission. The experts say that nothing could be further from the fact. The German psychologists know nothing beyond what American psychologists have contributed. Indeed there are many who are convinced that in psychologic science, as in other science, America leads the world. The bulletin of the Association for the Advancement of Psychoanalysis lists three basic principles which all of us should keep in mind:

1. Under war conditions an increase in anxiety and tension is natural and inevitable. Unless this is realized, an individual might consider himself cowardly and contemptible when he is actually sharing a common experience. If anxiety incapacitates an individual, then it is most probably not associated with the war and represents a personal problem for which psychiatric aid might be consulted.

2. Planned and directed efforts are valuable psychologic assets in controlling anxiety. Foolhardiness and impulsiveness are no cures for fear. They actually undermine individual and group morale.

3. Inactivity and isolation from the group beget anxiety. Useful, well directed, interrelated tasks in the interests of the community not only diminish individual tensions but are constructive and sustain general morale.

Obviously, morale is a matter of vital consequence to the nation. In July 1940 a Committee for National Morale was formed including representatives of all the various social sciences. In a recent issue of the *Journal of Educational Sociology* (December 1941) leading contributors discuss the importance of morale, the principle of morale building, the measurement of morale, the nature of the offensive from a psychologic point of view against the United States, and the danger points on the home front.

"A nation with good morale," as is pointed out by Dr. A. U. Pope, "is one with enthusiasm, confidence, teamwork and endurance." Many people like to think that morale is just common sense. However, the building of morale involves psychologic principles and studies of public opinion far beyond anything we have yet attempted in this country. The processes of morale building are closely allied to the processes of education. That morale is best built which is built from thousands of small centers in a nation rather than that based on the prestige and power of a few national figures. The chief danger points in the home front are obviously the bickering and the arguments which tend to split the nation into small groups, many organized specifically to question national decisions. Some of the incidents which have already occurred now that we are in the war indicate that the problem of the national morale is an exceedingly real one; we have not yet begun to deal with it effectively.

Current Comment

COORDINATION OF INDUSTRIAL HEALTH EFFORT

The first joint session between the Council on Industrial Health and the Subcommittee on Industrial Health and Medicine of the Federal Security Agency recommended that the Division of Industrial Hygiene of the National Institute of Health should develop, in cooperation with state health authorities and committees on industrial health in the state medical societies, a definite program of instruction on the fundamentals of industrial medicine, designed to carry into effect minimum standards set up to protect the health of employees. A plan recently inaugurated in Michigan has gained much favor as a practical expression of this recommendation. Whenever representatives of the Bureau of Industrial Hygiene in Michigan investigate working conditions in a plant, the employer is told that his plant physician will be welcome to accompany the inspectors. The Council on Industrial Health has inquired of other bureaus of industrial hygiene whether or not this arrangement would serve to improve coordination between the bureaus and the practicing medical profession. The response so far has been that such a plan, if regularly followed, would contribute more than any other single step toward improving the knowledge of the practicing profession about medical requirements in industry and the accepted methods for meeting these needs. Certainly committees on industrial health in the state and county medical societies should urge on their general membership the necessity for responding to invitations of this character. Physicians must assume responsibility in industrial health, especially in smaller plants. They must organize to meet the demands for wartime industrial production.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

OFFICE OF DEFENSE HEALTH AND WELFARE SERVICES

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Address all communications to
Procurement and Assignment Service
601 Pennsylvania Ave.
Washington, D. C.

PREFACE

The Directing Board of the Procurement and Assignment Service, through the Committee on Information, has drawn up the following information regarding the organization and functions of the Procurement and Assignment Service. This pamphlet is designed to answer questions which may arise in the minds of individual physicians, dentists and veterinarians concerning the activities of the Procurement and Assignment Service.

In the appendixes are complete lists of the various cooperating committees and agencies that should be consulted with regard to matters of policy pertaining to their offices.

The corps area officers and the state chairmen in the respective professions will be available for consultation and advice.

For the Directing Board.

S. F. SEELEY, M.D., Major, M. C., U. S. Army,
Executive Officer,
Procurement and Assignment Service.

HISTORY

The Procurement and Assignment Service was authorized by the President on Oct. 30, 1941. The creation of this agency resulted from a recommendation from the Subcommittee on Education to the Health and Medical Committee of the Office of Defense, Health and Welfare Services on March 31, 1941. Following a meeting of the Health and Medical Committee on April 28, this recommendation was transmitted to the Committee on Medical Preparedness of the American Medical Association for its consideration. The latter committee presented the recommendation to the House of Delegates of the American Medical Association, which resolved:

That the United States government be urged to plan and arrange immediately for the establishment of a central authority with representatives of the civilian medical profession to be known as the Procurement and Assignment Agency for physicians for the Army, Navy and Public Health Service and for the civilian and industrial needs of the nation.

On Oct. 22, 1941 the Health and Medical Committee named a commission to draft a plan for development of such a service. As a result of the meeting of this commission, it was recommended that an office for procurement and assignment of physicians, dentists and veterinarians should be established, that the office should be a part of the Office of Defense Health and Welfare Services and that the function of the office should be to procure personnel from existing qualified members of the professions concerned. The Procurement and Assignment Services, through the facilities of the Office of Defense, Health and Welfare Services, would have available the fiscal budgetary, legal and advisory departments of a well established governmental agency. The concluding paragraphs of its report are as follows:

For this reason a special commission, appointed by the Health and Medical Committee of the Office of Defense Health and Welfare Services has made the following recommendations:

1. That an Office of Procurement and Assignment of physicians, dentists and veterinarians be established.

2. That this office shall function as part of the Office of Defense, Health and Welfare Services, which is itself a part of the Office for Emergency Management.

3. The function of this office shall be to procure personnel from existing qualified members of the professions concerned. The office shall receive from various governmental and other agencies requests for medical, dental and veterinary personnel. These requests shall indicate the number of men desired, the time during which they must be secured, the qualifications and limitations placed on such personnel. The office must then by appropriate mechanism arrange to secure lists of professional personnel available to meet these requirements, utilizing such existing rosters, public and private, as it may find acceptable. It shall also be authorized to approach such professional personnel as is considered to be available and to use suitable means to stimulate voluntary enrolment.

4. The Office of Procurement and Assignment shall consist of a board of five members, one of whom shall be chairman. This board shall be chosen from members of the medical, dental or veterinary professions and shall not include any salaried employees of the federal government. This board shall function without salary but shall be entitled to actual and necessary

transportation, subsistence and other expenses incidental to the performance of its duties.

5. The board shall appoint an executive secretary who shall serve also as executive officer and who shall be without vote in its deliberations and decisions. He shall serve as a full time employee with salary (to be determined) and with such assistants as the board may determine necessary to carry out its functions.

6. The board shall be authorized to establish such advisory committees and subcommittees as may be necessary. These committees shall represent the various interests concerned, such as medical, dental and veterinary schools, hospitals, Negro physicians and women physicians. Members of such committees shall serve without salary but shall be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of their duties.

7. The board shall also be authorized to request various agencies of the government using medical, dental or veterinary personnel to appoint liaison officers and representatives to advise the board in carrying out its functions.

8. In carrying out its functions the board shall cooperate with such agencies as are now established under the Selective Service as well as other federal agencies.

On October 30, 1941 the following letter to the President from the Director of Defense Health and Welfare Services was approved by the President and constitutes the authority under which the Procurement and Assignment Service operates:

October 30, 1941.

My Dear Mr. President:

The coordination of the various demands made on the medical, dental and veterinary personnel of the nation and the most efficient utilization of this personnel would seem to require the establishment of a special agency capable of recording the qualified personnel available, of assigning or encouraging enlistment of such personnel in the services where most needed and of giving every qualified physician, dentist and veterinarian an opportunity to enroll himself in some service demanded by the national need.

For these reasons I wish to propose that there be established as one of the principal subdivisions of the Office of Defense Health and Welfare Services an office for the procurement and assignment of physicians, dentists and veterinarians. This office would be known as the Procurement and Assignment Agency.

The functions of the agency would be (1) to receive from various governmental and other agencies requests for medical, dental and veterinary personnel, (2) to secure and maintain lists of professional personnel available, showing detailed qualifications of such personnel, and (3) to utilize all suitable means to stimulate voluntary enrolment, having due regard for the overall public health needs of the nation, including those of governmental agencies and civilian institutions.

The agency would consist of a board of five members, one of whom would serve as chairman. The board would serve without salary but would be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of its duties.

A full time executive officer (with salary to be determined) would be appointed, together with such assistants as would be required to carry out the functions of the Agency.

I recommend that the board be composed of Dr. Frank Lahey, chairman, Dr. James Paullin, Dr. Harvey B. Stone, Dr. Harold S. Diehl and Dr. C. Willard Camalier.

This communication is addressed to you in accordance with provisions contained in paragraph 4 of the Executive Order, dated Sept. 3, 1941, "Establishing the Office of Defense Health and Welfare Services in the Executive Office of the President and Defining Its Functions and Duties," to the effect that the President shall approve the establishment of the principal subdivisions of the Office of Defense Health and Welfare Services and the appointment of the heads thereof.

In the event you approve the establishment of the Procurement and Assignment Agency, together with the board membership as recommended, I shall proceed immediately with the creation of the agency and will prepare budget estimates in the amount of approximately $50,000 for submission to the Budget Bureau to cover the costs of the agency.

In addition I would propose to instruct the Agency to draft legislation which may be necessary to submit to the Congress providing for the involuntary recruitment of medical, dental and veterinary personnel, in the event the exigencies of the national emergency appear to require it.

Sincerely yours,

PAUL V. MCNUTT,
Director.

Approved
FRANKLIN D. ROOSEVELT.

This letter was approved by the President, Oct. 30, 1941, and the Procurement and Assignment Service was organized accordingly.

LOCATION OF OFFICES

Central Office.—The accompanying chart shows the organization of the Procurement and Assignment Service. The executive officer is Sam F. Seeley, M.D., M. C., U. S. Army. The central office is located at 601 Pennsylvania Avenue N.W., Washington, D. C. To facilitate correspondence, all communications should be addressed to the central office.

Consultant Office.—A consultant office has been established in the headquarters of the American Medical Association, 535 North Dearborn Street, Chicago, under the supervision of Dr. R. G. Leland, where special information regarding physicians is maintained. Similar information regarding dentists is available at the headquarters of the American Dental Association, 212 East Superior Street, Chicago, and regarding veterinarians at the headquarters of the American Veterinary Medical Association, 600 South Michigan Avenue, Chicago. These facts include those supplied directly to the organizations concerned, the classifications developed by the special committees of the Division of Medical Sciences of the National Research Council and confidential information supplied by other agencies.

Corps Area Committees.—In each of the nine Army corps areas, a committee has been established. Each corps area committee includes a chairman, two physicians chosen from the general medical profession, a dentist chosen from the general dental profession, a representative of medical education, a representative of dental education, a representative chosen from the veterinary profession and a representative of the hospitals. These committees are advisory to the Procurement and Assignment Service in reference to questions relating to personnel and are part of the field organization of the Office of Defense Health and Welfare Services. The chairman of each of these committees acts in a liaison capacity to the corps area surgeons, and representatives of the Office of Civilian Defense, the Selective Service System in the corresponding corps areas. Liaison between the Procurement and Assignment Service and the Bureau of Medicine and Surgery, Navy Department, is maintained directly through the Executive Officer and a representative of the Bureau.

The following is a list of the nine corps area chairmen and the states in each corps area:

First Corps Area.—Chairman, Dr. W. G. Phippen, 31 Chestnut Street, Salem, Mass. States comprising corps area: Connecticut, Maine, New Hampshire, Rhode Island, Massachusetts, Vermont.

Second Corps Area.—Chairman, Dr. A. W. Booth, 222 West Church Street, Elmira, N. Y. States comprising corps area: Delaware, New Jersey, New York.

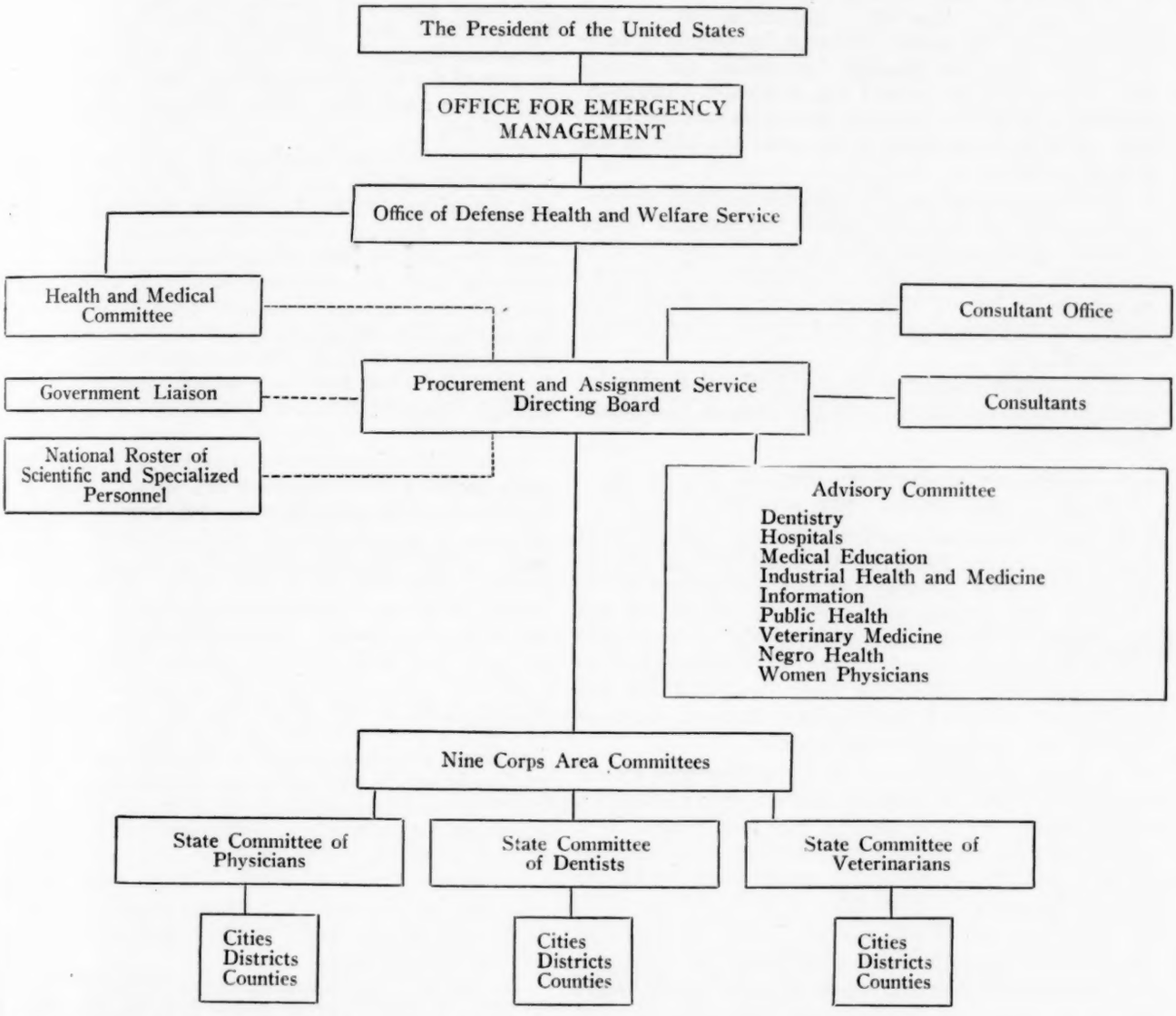
Third Corps Area.—Chairman, Dr. A. M. Shipley, University Hospital, Baltimore. States comprising corps area: Maryland, Pennsylvania, Virginia, District of Columbia.

Fourth Corps Area.—Chairman, Dr. Edgar Greene, 478 Peachtree Street N.E., Atlanta, Ga. States comprising corps area: Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, South Carolina, North Carolina.

Fifth Corps Area.—Chairman, Dr. E. L. Henderson, 606 S. 4th Street, Louisville, Ky. States comprising corps area: Indiana, Kentucky, Ohio, West Virginia.

corps area committees and to the central office. To the state committees and also to the county, district and local committees will be referred especially questions concerning the essential character of such services as a physician, dentist or veterinarian may be rendering, thus determining his availability. They will also familiarize themselves with the functions of the Procurement and Assignment Service and thus be able to advise those in their community concerning its work.

ORGANIZATION OF THE PROCUREMENT AND ASSIGNMENT SERVICE



Sixth Corps Area.—Chairman, Dr. Charles Phifer, 30 North Michigan Avenue, Chicago. States comprising corps area: Illinois, Wisconsin, Michigan.

Seventh Corps Area.—Chairman, Dr. Roy W. Fouts, 107 S. 17th Street, Omaha. States comprising corps area: Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, South Dakota, North Dakota, Wyoming.

Eighth Corps Area.—Chairman, Dr. Sam E. Thompson, Kerrville, Texas. States comprising corps area: Arizona, New Mexico, Oklahoma, Texas, Colorado.

Ninth Corps Area.—Chairman, Dr. Charles A. Dukes, 426 17th Street, Oakland, Calif. States comprising corps area: California, Idaho, Montana, Nevada, Oregon, Utah, Washington.

State Chairmen and State Committees.—The state chairmen and the state committees are advisory to the

THE NATIONAL ROSTER

The National Roster of Scientific and Specialized Personnel was created by Executive action in July of 1940 as an office within the Executive Office of the President to be jointly supervised by the National Resources Planning Board and the United States Civil Service Commission. Two primary functions were assigned to the Roster: first, the formulation of as complete a list as possible of all of the United States scientifically and professionally trained citizens; and, second, the development of proper procedures for the most effective utilization of the skills of these citizens in connection with defense and other governmental and national needs. In pursuance of this directive, the Roster has

established a completely analytical punch-card list of the names, locations, and qualifications of the country's specially trained individuals in more than fifty strategic scientific and professional fields. Because of the fact that the American Medical Association was engaged in developing its own roster, the National Roster did not undertake to include any but a small specialized group of the general medical profession. It became necessary therefore to work out an agreement of cooperation between the National Roster and the Procurement and Assignment Service so that the latter could have the benefit of the Roster's experience and facilities in maintaining up to date lists of physicians, dentists and veterinarians. By special action of the boards of trustees of the American Medical Association, the American Dental Association and the American Veterinary Medical Association, all punch card files in the possession of these associations were made available to the National Roster.

By these joint efforts, the Procurement and Assignment Service will have available in the National Roster at Washington complete records of all material submitted by the professions. The professions in turn will have the benefit of material collected through the roster for their own punch card files at their national headquarters.

A consultant committee to the National Roster for medicine includes Drs. Morris Fishbein, R. G. Leland, and Olin West.

INFORMATION UTILIZED IN THE PROCUREMENT AND ASSIGNMENT SERVICE

Questionnaire.—American Medical Association: Beginning in June 1940, the American Medical Association circulated a questionnaire to the physicians of the country. The information from this questionnaire was tabulated in a punch card system which has been made available to the National Roster. Additional information concerning physicians was developed by the Division of Medical Sciences of the National Research Council and other cooperating agencies.

American Dental Association: The American Dental Association has circulated a questionnaire to all dentists. The information thus secured has been placed in a punch card system in the headquarters of the American Dental Association and also made available to the National Roster. The information in the headquarters of the American Dental Association is supplemented by information secured from cooperating agencies.

American Veterinary Medical Association: Through cooperation between the American Veterinary Medical Association and the National Roster, a punch card system covering the veterinary medical profession will be available in the National Roster and in the Headquarters of the American Veterinary Medical Association.

Following the declaration of war, Dec. 8, 1941, other questionnaires were immediately circulated with a view to securing lists of names of physicians who would offer their services for immediate utilization in the emergency. Since the supply of dentists and veterinarians was at this time adequate to meet the needs of the armed forces, additional enrolment forms were circulated only to physicians. As a result of this procedure the immediate needs of the armed forces were satisfied.

SPECIAL ENROLMENT FORM AND QUESTIONNAIRE FOR PROCUREMENT AND ASSIGNMENT SERVICE

The Procurement and Assignment Service, cooperating with the National Roster of Scientific and Specialized Personnel, has prepared special questionnaires for circulation to every physician, dentist and veterinarian in the United States. This questionnaire will come directly to all physicians, dentists and veterinarians as soon as possible after the National Registration on Feb. 16, 1942. *Every physician, dentist and veterinarian, regardless of age, sex, physical condition, citizenship or employment, should fill out and return the enrolment form and the questionnaire.* Those physicians, dentists and veterinarians who have been commissioned in any United States service previous to the receipt of the enrolment form and questionnaire should so indicate under the heading "remarks" on the enrolment form.

The original questionnaire and enrolment forms previously circulated by the American Medical Association, the American Dental Association and the American Veterinary Medical Association are being utilized to meet requisitions from the armed services and other agencies, until the National Roster is complete and the Procurement and Assignment Service is working routinely. The additional information secured by the special questionnaire now to be described will bring up to date the facts necessary to place each physician, dentist and veterinarian in the work for which he is best qualified.

Roster Questionnaire.—The questionnaire, as developed, includes space on which the physician, dentist or veterinarian will supply the usual data regarding name, address, date and place of birth, citizenship, marital status, race and sex, school of graduation, previous military service in the United States or in the armed forces of other countries, membership in the reserve corps or commissions in any branch of government service. Any additional information regarding special aptitudes, such as knowledge of aviation, radio or cryptanalysis, which might be of value, knowledge of foreign languages and foreign travel will also be included. Again, it should be emphasized, this information is sought to supplement information previously supplied on questionnaires. It is recognized that the status of any physician, dentist or veterinarian may have changed materially since the time when previous questionnaries were submitted. The new questionnaire will also be tabulated in a special punch card system which will be coordinated with the punch card systems previously mentioned.

In the new questionnaire, opportunity is also given to state in detail appointments held in various local, industrial, state or governmental agencies, in civil practice, and in education and research. Specialization is recognized by appropriate designations which coordinate with certification of specialists by the certifying boards and also with appointments on the staffs of hospitals and other indications of special practice.

The method of practice, whether individual, in partnership or in groups is indicated. Finally an opportunity is given to every physician, dentist and veterinarian to indicate his preference as to the type of service which he will be capable of rendering to the United States during the war.

The Enrolment Form.—On the enrolment form which comes with the questionnaire the physician, dentist or veterinarian voluntarily enrols himself with the Pro-

curement and Assignment Service. He indicates his first, second, third and fourth preferences of the military, governmental, industrial or civil categories that may require his assistance.

Announcement will be made repeatedly in medical, dental and veterinary medical publications of the time when the circulation of the enrolment form and the questionnaire begins. When you receive your enrolment form and questionnaire, PLEASE ACT PROMPTLY. Those who fail to receive an enrolment form and questionnaire are requested to write to the National Roster of Scientific and Specialized Personnel, 916 G Street N.W., Washington, D. C., within six weeks after announcement has been made that the circulation has begun.

CERTIFICATE AND INSIGNIA

Physicians, dentists and veterinarians who enroll with the Procurement and Assignment Service will receive a numbered certificate indicating that they have made themselves available and will be privileged to wear insignia indicating that such enrolment has been made.

PROCEDURE TO MEET PRESENT NEEDS

The present Army and Navy needs are for physicians under 36 years of age. Those under 36 desiring immediate commission may write now to the Procurement and Assignment Service, 601 Pennsylvania Avenue N.W., Washington, D. C. Their letters will be treated as applications and those who are qualified will receive proper application forms with view of commission in the Army or the Navy. All physicians over 36 and all dentists and veterinarians should await the receipt of the enrolment forms.

METHODS OF ACTION OF THE PROCUREMENT AND ASSIGNMENT SERVICE

By authority of the President, the Procurement and Assignment Service receives requests for personnel from the following governmental agencies:

MEDICAL

United States Army Medical Corps.
United States Navy Medical Corps.
United States Public Health Service.
United States Veterans Administration.
United States Civil Service Agencies.
St. Elizabeth's Hospital (Washington, D. C.), Resident Staff and Interns only.
United States Indian Service.
Panama Canal Service.
Office of Civilian Defense (full time).

DENTAL

United States Army Dental Corps.
United States Navy Dental Corps.
United States Public Health Service.
United States Veterans Administration.
United States Indian Service.
Panama Canal Service.
Office of Civilian Defense.

VETERINARY

United States Army Veterinary Corps.
United States Navy Hospital Corps Specialists.
United States Public Health Service.
United States Bureau of Animal Industry.
Federal Extension Service.
State Extension Service.
United States Department of Agriculture Marketing Service.
War Department (Federal Civil Service Status—not Army).
Federal Agricultural Experiment Stations.

The Procurement and Assignment Service is also charged with the stimulation of voluntary enrolment, having due regard for the overall health needs of the nation, including the personnel of civilian institutions.

When a request is received from a federal agency for medical, dental or veterinary personnel, the names of those who are qualified to meet the specifications established by the requisitioning agency, who are available and who have indicated by enrolling with the Procurement and Assignment Service, their willingness to apply for a commission or employment are supplied by the National Roster, utilizing the punch card system previously described. These names are arranged in lists by states. A copy of each list is forwarded to the Consultant Office of physicians, dentists or veterinarians respectively, where each is made more accurate by the elimination of the names of those who do not qualify in view of the special information held in the Consultant Office. These lists are then referred to the state chairmen, who make a decision as to the immediate availability of the physicians, dentists or veterinarians concerned. Such a step is necessary because the availability of the individual may have changed in the period between the return of the official questionnaire in March 1942 and the time when the physician, dentist or veterinarian is notified of the need for his services. The lists are then forwarded by the state chairmen to the Procurement and Assignment Service in Washington.

From these lists the central office obtains the names of those individuals who have thus been found qualified and available.

PHYSICIANS, DENTISTS OR VETERINARIANS FOR THE UNITED STATES ARMY MEDICAL DEPARTMENT

The procedure with reference to supplying personnel to the United States Army Medical Department is governed by the following letter of instruction sent out by the Adjutant General's Office to all corps area and department commanders on Jan. 21, 1942:

WAR DEPARTMENT

The Adjutant General's Office
Washington

January 21, 1942

Subject: Procurement of Officers for Medical Department, Army of the United States.

To: All Corps Area and Department Commanders.

1. Letter from this office dated Feb. 3, 1941, file AG 381 (8-13-40) R-A, Subject: "Assistance of the American Medical Association in the classification and procurement of physicians for military service," is rescinded.

2. There has been established under the Office for Emergency Management, Office of Defense Health and Welfare Services, a Procurement and Assignment Service to coordinate the procurement of physicians, dentists and veterinarians for all governmental, industrial and civilian requirements.

3. In order to expedite appointments in the Medical Corps, Dental Corps and Veterinary Corps, Army of the United States, the following procedure will govern the processing of all applications:

(*a*) All individual inquiries for information concerning a commission or offers to serve as a medical, dental or veterinary officer should be acknowledged by the headquarters receiving the communication and the communication itself forwarded by indorsement to the Executive Officer, Procurement and Assignment Service, Office of Defense Health and Welfare Services, Social Security Building, Washington, D. C.

(*b*) The Procurement and Assignment Service will supply to individual applicants who are eligible and qualified for appointment the required forms (WD AGO Form No. 170, "Applica-

tion for Appointment and Statement of Preferences for Reserve Officers," in duplicate, and WD AGO Form No. 178 and 178-2, both in duplicate) together with a request on the surgeon of the nearest Army post for a final type physical examination. Each request for final type physical examination authorized by the Procurement and Assignment Service will be honored by surgeons of Army posts. Application forms and supporting papers, except the report of physical examination, will be returned by the applicant to the Procurement and Assignment Service; the report of physical examination (WD AGO Form No. 63) will be forwarded by the surgeon of the station at which the examination was conducted, direct to the Surgeon General.

(*c*) The completed applications and supporting papers, except report of physical examination, will be transmitted by the Procurement and Assignment Service to the Surgeon General together with a statement by that service derived from its files and regarding eligibility of the applicant for appointment in the Medical, Dental and Veterinary Corps, Army of the United States, as prescribed by current Army regulations. The Procurement and Assignment Service will also furnish the Surgeon General with the professional classification and evaluation of the applicant as determined from the recent nationwide survey made by the Committee on Medical Preparedness of the American Medical Association.

(*d*) The Surgeon General will forward such completed applications to the Adjutant General as prescribed in paragraph 10 (4), Army Regulations No. 605-10, and inform the Procurement and Assignment Service of action recommended.

4. No change in the present procedure for the appointment of graduates of medical units of the Reserve Officers' Training Corps in the Medical Corps Reserve or for appointment in the Army of the United States of physicians and dentists for affiliated units, of junior and senior students in medical schools in the Medical Administrative Corps, Army of the United States, or of graduates of such schools who are to be appointed in the Medical Corps, Army of the United States, on graduation.

5. When the applications for appointment have been approved the Adjutant General will notify the applicant direct of his appointment with instructions as to proper completion of oath of office and finger print card and the return of such forms direct to the Adjutant General. When the oath of office has been received by the Adjutant General, the Surgeon General and the Executive Officer, Procurement and Assignment Service of the Office of Defense Health and Welfare Services, Office for Emergency Management, Washington, D. C., will be notified.

By order of the Secretary of War.

(Note: Address now 601 Pennsylvania Avenue N.W., Washington, D. C.)

In summary, the procedure is as follows:

1. The Surgeon General requisitions needed personnel from the Central Office of the Procurement and Assignment Service.

2. The National Roster prepares an appropriate list of names from the National Roster of Scientific and Specialized Personnel.

3. The National Roster sets aside the cards from the file of those available.

4. This list is forwarded to the Consultant Office, Procurement and Assignment Service.

5. The Consultant Office forwards the names to the chairmen of relevant state committees of the Procurement and Assignment Service.

6. These chairmen forward to the central office the lists they received, with names of unavailable (essential) persons indicated.

7. The Central Office mails application forms and authority for physical examination to the qualified and available proposed applicants.

8. Each applicant applies for "final type" physical examination at the nearest Army post.

9. The examiner sends the report to the Surgeon General's Office.

10. The applicant returns his completed application blank and supporting papers direct to the Central Office of the Procurement and Assignment Service.

11. The central office forwards the application form and the supporting papers direct to the Surgeon General.

12. The Surgeon General's Office joins the completed application blank, supporting papers and the corresponding report of physical examination.

13. The Surgeon General's Office determines whether or not to recommend the applicant to the Adjutant General on the basis of physical and professional qualifications.

14. The Adjutant General notifies the applicant that he has or has not been appointed.

15. The Central Office of the Procurement and Assignment Service is notified whether the applicant has been, or has not been, appointed.

16. The names of those not commissioned are again placed in the file of the National Roster so that the persons affected may be available for other service.

NOTE.—After the applicant has sent his application form and supporting papers to the Central Office of the Procurement and Assignment Service, he may expect his further correspondence to be carried on with the Surgeon General's Office or the Adjutant General's Office.

PROVISION OF PHYSICIANS AND DENTISTS FOR THE UNITED STATES NAVY MEDICAL AND DENTAL CORPS

When a request is received from the United States Navy Medical or Dental Corps for personnel, the same procedure will be followed in securing lists of names as has already been described in the previous section regarding the provision of personnel for the Army. The lists of names received from the state chairman will then be forwarded by the Procurement and Assignment Service to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. The Bureau of Medicine and Surgery will then conduct negotiations with the physicians and dentists concerned through the commandants of their respective naval districts. Should a physician or dentist apply directly to a naval commandant for commission in the United States Naval Medical or Dental Corps, the procedure outlined in the following letter from the Bureau of Medicine and Surgery to the commandants of all naval districts, dated Feb. 3, 1942, prevails:

February 3, 1942.

From: The Chief of the Bureau of Medicine and Surgery.
To: The Commandant, All Naval Districts.
Subject: Status of Procurement and Assignment Service for Physicians, Dentists and Veterinarians in connection with recruitment of medical and dental officers for the U. S. Naval Reserve.

1. The Secretary of the Navy has approved the recommendations of the Chief of the Bureau of Medicine and Surgery whereby the services of the "Procurement and Assignment Service, of the Defense Health and Welfare Services," an organization recently created by the President, may be utilized by the Navy in facilitating the recruitment of medical and dental officers for the U. S. Naval Reserve.

2. The primary function of the above mentioned service as pertains to the Navy is to furnish information which indicates certain applicants for appointment in the Medical and Dental Corps of the Naval Reserve either do or do not occupy positions in civil life which are considered essential to the national defense, to the proper functioning of medical and dental schools or whose acceptance of appointments in the Naval Reserve would jeopardize the health and welfare of a local community,

such as removing the only qualified orthopedic surgeon from a community composed practically entirely of miners or workers in a factory producing materials essential to the government.

The furnishing of such information to the commandants, before investigation of an applicant, would be of distinct advantage in that the number of investigations would be materially reduced and, in the case of applicants considered essential or holding civilian appointments connected with national defense, need not be accomplished.

3. In this connection, the following procedure is suggested with the request that it be executed by the District Medical Officer on all applications received after Feb. 16, 1942:

(*a*) Whenever a physician or dentist makes application for appointment, four copies of the enclosed form are to be immediately filled out and the original and two copies forwarded to the Bureau of Medicine and Surgery. It is desired these forms be forwarded when the first contact is made in any given case, without waiting for the applicant to return his completed application.

(*b*) The Bureau of Medicine and Surgery will retain one copy and send the original and one copy to the Executive Secretary of the Procurement and Assignment Service.

(*c*) When the Executive Secretary of the Procurement and Assignment Service has placed his endorsement thereon, he will return both copies to the commandant concerned.

(*d*) If the candidate is not cleared, both copies should be forwarded by the commandant to the Bureau of Medicine and Surgery and the candidate informed by the commandant his application cannot be accepted in view of the action of the Procurement and Assignment Service. The Bureau of Medicine and Surgery will make the second endorsement, retain the original and forward the copy to the Executive Officer of the Procurement and Assignment Service.

(*e*) If the candidate is cleared, both the original and the copy of the form should be forwarded to the Bureau of Navigation with the application. After final action is taken the Bureau of Medicine and Surgery will make the second endorsement, retain the original and forward the copy to the Executive Officer of the Procurement and Assignment Service.

(*f*) About fifty copies of the form adaptable for this purpose are enclosed to serve as a sample of others to be mimeographed or printed locally.

ROSS T. MCINTIRE.

In summary, the procedures for Navy procurement are as follows:

1. The Bureau of Medicine and Surgery requisitions personnel from the central office of the Procurement and Assignment Service.

2. An appropriate list of names is prepared from the National Roster of Scientific and Specialized Personnel.

3. The National Roster sets aside the cards bearing these names from the file of those available.

4. The list is forwarded to the Consultant Office, Procurement and Assignment Service.

5. The Consultant Office forwards the names to the chairmen of relevant state committees of the Procurement and Assignment Service.

6. These chairmen forward to the central office the lists they received, with names of unavailable (essential) persons indicated.

7. The central office forwards the names of qualified and available persons to the Bureau of Medicine and Surgery.

8. The Bureau of Medicine and Surgery conducts the subsequent negotiations with the proposed applicants.

9. The Bureau of Medicine and Surgery notifies the central office of the Procurement and Assignment Service which applicants have been and which have not been appointed.

10. The names of those not commissioned are again placed in the file of the National Roster, so that the persons affected may be available for other services.

When an applicant applies directly to any Army installation for commission in the Army Medical or Dental or Veterinary Corps, he is referred to the Procurement and Assignment Service. When an applicant applies to any Naval Commandant for commission in the U. S. Medical or Dental Corps, his application is sent to the Bureau of Medicine and Surgery and such names are cleared through the Procurement and Assignment Service before the commissions are granted.

UNITED STATES PUBLIC HEALTH SERVICE

The Surgeon General of the United States Public Health Service has issued the following circular to all District Directors and Medical Officers in Charge concerning new appointment procedure for physicians and dentists:

February 14, 1942.

1. The Procurement and Assignment Service within the Office of Defense Health and Welfare Services has the responsibility for assisting in the procurement and assignment of physicians and dentists in such manner as to best serve the over-all health and medical needs of the country. It is essential that the personnel policy of the Public Health Service be consistent with the major purposes of the Procurement and Assignment Service.

2. It is desired that applications be solicited from qualified physicians and dentists for commission in the reserve corps of the U. S. Public Health Service. The expansion of the reserve corps of the Public Health Service is necessary to serve two major purposes:

(*a*) The creation of a pool of qualified public health personnel to safeguard essential civilian health services and at the same time to be available for immediate, though temporary, active duty in the event of some major public health emergency.

(*b*) The procurement of sufficient numbers of qualified physicians and dentists to enable the Public Health Service to carry on its normal and war-time activities.

3. In order to serve these two major purposes, it will be necessary to recruit into the reserve of the Public Health Service physicians and dentists who come within the two following categories:

(*a*) Those who are now engaged in public health work and who by reason of special training and experience occupy strategic positions in their present civilian capacities. Such personnel would be expected to remain on inactive status with the Public Health Service, except in the event of a major disaster, in which case they would be subject to immediate, though temporary, active duty.

(*b*) Those who are professionally qualified and also available for immediate active duty in the Public Health Service for such periods of time as the exigencies of the service may determine.

4. Applications from physicians and dentists relating to commissions in the reserve of the Public Health Service will be processed in the following manner: On receipt of an application by the office of the Surgeon General, the application forms and all supporting papers, including the report of physical examination, will be transmitted with a definite recommendation of the Surgeon General to the Procurement and Assignment Service. The Procurement and Assignment Service will in turn certify to the Surgeon General as to the availability of the individual for appointment. In the case of public health personnel occupying strategic positions in civilian posts, the criterion of availability for commission would rest largely upon the fact that the individual occupies a strategic position, and therefore should remain as long as practicable on an inactive status. In the case of personnel to be called to immediate active duty, the criterion of availability would be based upon the ability of the community to spare the services of the individual. Upon receipt

from the Procurement and Assignment Service of notice of clearance, indicating that the applicant is available for a commission in the reserve of the Public Health Service, the appointment will be completed in the usual manner.

5. The above procedure does not apply to the recruiting of individuals for the regular corps of the Public Health Service, or to the appointment of interns or doctors certified by the Civil Service Commission, or to the appointment of sanitary engineer officers in the reserve.

6. When the Public Health Service is without acceptable applications from physicians and dentists for filling vacancies, the Surgeon General will request the Procurement and Assignment Service for the names and qualifications of persons available to fill such vacancies. When decision has been reached as to the selection or nonselection of such persons, the Surgeon General will advise the Procurement and Assignment Service.

7. The Procurement and Assignment Service has given its endorsement to the procedure outlined above.

THOMAS PARRAN,
Surgeon General.

Approved:
PAUL V. MCNUTT,
Administrator.

UNITED STATES CIVIL SERVICE COMMISSION

In accordance with the recommendation of the Medical Director, the United States Civil Service Commission has approved a procedure in connection with the recruitment of qualified persons whereby the Commission will cooperate with the Procurement and Assignment Service and deal directly with this service in its recruitment program.

1. The necessary application forms, all properly executed, are to be filed by the applicant with the United States Civil Service Commission at Washington, D. C. Information concerning necessary qualifications is to be obtained from the announcement of the examination. Application forms and announcements may be obtained from the United States Civil Service Commission, Washington, D. C.

2. Applications received under announcements of examinations for physicians, dentists and veterinarians will be rated by the United States Civil Service Commission.

3. The names of those applicants who have received an eligible rating will be submitted to the Procurement and Assignment Service, with the view of determining whether or not such applicants are essential in their present positions and localities.

4. The names of those persons who have been designated by the Procurement and Assignment Service as being essential in their present positions and localities will not be certified and such persons will be notified by the United States Civil Service Commission that they cannot be certified in view of the action taken by the Procurement and Assignment Service.

5. The names of those persons who have been designated as nonessential will be certified in routine manner to fill the personnel needs of the various government agencies under civil service rules and regulations.

MEDICAL, DENTAL AND VETERINARY EDUCATION

To meet the needs of the nation for a continuing supply of trained medical, dental and veterinary personnel for the armed forces and for civilian needs, and to maintain the standards of education which have prevailed in these fields, the medical, dental and veterinary professions initiated an effort as far back as 1940 to provide for deferment of students in qualified medical, dental and veterinary schools from induction under the provisions of the Selective Service acts. Through the cooperation of the Director of Selective Service, the following memorandums now prevail:

Deferments of Professional Students and Instructors.—The Selective Service System, Washington, D. C., on January 12, 1942, issued the following supplement to Memoranda (I-62), (I-91), (I-99) and (I-150) Occupational Deferment of Engineering, Chemical, Physics, Medical, Dental Students and Instructors (III):

The attention of local boards is again invited to the necessity of seriously considering for deferment students in certain specialized professional fields in which dangerously low levels of manpower are found to exist. This memorandum is in addition to and does not rescind those previously issued which apply to students in other critical fields.

Subsequent to the declaration of war, local Selective Service agencies have in many instances proceeded to classify registrants without regard to the fact that they are in training or preparation for activities the maintenance of which is essential to the national health, safety or interest and war production. This is particularly true in cases of engineering, chemical, physics, medical and dental students.

Admittedly there is an overlapping of the military and civilian requirements of a nation at war; however, it must be borne in mind that the one is dependent on the other. It is estimated that the expanding army will eventually require doctors and dentists in numbers heretofore unknown. They will not be available if those students who show reasonable promise of becoming doctors and dentists are inducted prior to becoming eligible for commissions.

War industries are undergoing a hitherto unknown expansion. Aeronautical, civil, electrical, chemical, mining, metallurgical, mechanical and radio engineers together with physicists and chemists are essential to insure a sufficient flow of material for the armed forces, and industry must look to the engineering, chemical and physics students now in training to meet their present and future requirements.

It is equally important that instructors in these fields be seriously considered for occupational deferment. Shortages of qualified instructors are known to exist. The educational institution employing the instructor should be requested to file DSS Form 42A in all cases in which deferment is sought.

In considering student deferment cases, certain local boards are requiring the execution of DSS Form 42A in addition to the affidavit of the college or university contained in Bulletin No. 10 issued by the American Council on Education. DSS Form 42A should not be required when the American Council on Education affidavit has been submitted.

Local boards will be informed when the manpower requirements necessary to the national health, safety or interest and war production become static. Until such time, the policy set forth in the Memoranda to All State Directors I-62, I-91, I-99 and I-150 remains in force.

LEWIS B. HERSHEY, Director.

All students holding letters of acceptance from deans for admission to dental and veterinary colleges and all students of good academic standing in these colleges should present letters or have letters presented for them by their deans to their local boards of the Selective Service System. All premedical students who have letters of acceptance from deans for admission to medical colleges but who have not actually matriculated should present these letters. This step is necessary in order to be considered for deferment in class II-A as a medical, dental or veterinary student. If local boards classify such students in class I-A, they should immediately notify their deans and, if necessary, exercise rights of appeal to their local boards of appeals. If, after exhausting such rights of appeal, further consideration is necessary, request for further appeal may be made to the state directors and if necessary to the national director of the Selective Service System. These officers have the power to take appeals to the President.

On January 28, 1942, the following memorandum (I-363) was released by the Director of Selective Service to all state directors of the Selective Service System.

OCCUPATIONAL DEFERMENTS OF MEDICAL DOCTORS, DENTISTS AND DOCTORS OF VETERINARY MEDICINE

Information previously distributed by this headquarters clearly indicates an overall shortage of medical doctors, dentists and doctors of veterinary medicine in the nation. Since war was declared, the shortage of these professional men has become acute. It is now manifest that every qualified doctor, dentist and veterinarian must serve where he can render the greatest professional service to the nation.

In order to accomplish this purpose, the President, by Executive Order, has formed the Procurement and Assignment Service, under the Office of Defense Health and Welfare Services. This Service was formed primarily for the purpose of gathering and making available information with respect to the supply of qualified practitioners in the fields of medicine, dentistry and veterinary medicine, with a view of securing the most effective allocation of medical manpower as indicated by the requirements of the armed forces, civilian needs and industrial medicine.

To work with the headquarters of this Service in Washington, there is being organized a committee for each Corps Area in the Continental United States. Each committee will consist of five doctors, two dentists and one veterinarian. The committees have been accepted as advisers to the nine Corps Area Surgeons, to the Naval District Surgeons and to the Regional Medical Officers of the Office of Civilian Defense and will operate not only through the subdivisions of the medical, dental and veterinary associations but also with the profession at large in securing information and giving advice.

When considering the classification of any registrant who is a qualified medical doctor, dentist, or doctor of veterinary medicine, the Director of Selective Service desires that local boards, through the State Director, shall consult the Procurement and Assignment Committee of the Corps Area for information as to the availability of qualified medical doctors, dentists and doctors of veterinary medicine in the community. This information shall be considered by the local board in determining the registrant's classification. The Executive Order referred to in no way affects the authority of the Selective Service System to classify registrants. The procedure has been established for the purpose of making such information available to local boards.

For the convenience of the State Director and the local boards, the names and addresses of the Chairmen of the Nine Corps area committees of the Procurement and Assignment Service are listed:

First Corps Area: Dr. W. G. Phippen, Salem, Mass.
Second Corps Area: Dr. A. W. Booth, Elmira, N. Y.
Third Corps Area: Dr. A. M. Shipley, Baltimore, Md.
Fourth Corps Area: Dr. Edgar Greene, Atlanta, Ga.
Fifth Corps Area: Dr. E. L. Henderson, Louisville, Ky.
Sixth Corps Area: Dr. Charles H. Phifer, Chicago, Ill.
Seventh Corps Area: Dr. Roy W. Fouts, Omaha, Neb.
Eighth Corps Area: Dr. Sam E. Thompson, Kerrville, Texas.
Ninth Corps Area: Dr. Charles A. Dukes, Oakland, Calif.

LEWIS B. HERSHEY, Director.

DEFERMENT FOR STUDENTS

The Secretary of the Navy recently approved a change in Navy regulations whereby it is now possible for persons who have been accepted for entrance in the next entering class and all medical students in class A medical colleges and approved dental colleges to be appointed in the United States Naval Reserve with the commission Ensign H-V (P), provided they meet the physical and other requirements for such appointment. It should be noted that this applies not only for persons holding letters of acceptance and freshmen and sophomore students in these medical and dental schools but also juniors and seniors.

The Secretary of War has recently approved a change in Army Regulations which authorizes the commission as Second Lieutenant, Medical Administrative Corps, Army of the United States, of all students in class A medical colleges and to those persons who have matriculated in these colleges, providing they meet the physical and other requirements for such appointment. It should be noted that this opportunity includes freshmen and sophomores as well as juniors and seniors.

For commission in the Navy, application forms may be obtained from the dean's office or from some one designated by him, or from the commandant of the naval district in which the applicant resides. Further information may be obtained from the office of the commandant of any naval district.

For commission in the Army, applications should be made through the office of the dean to the corps area surgeon of the corps area in which the applicant resides.

Students of the Medical Reserve Officers' Training Corps should continue as before, with a view of obtaining commissions as First Lieutenant, Medical Reserve Corps, on graduation.

Students who hold commissions come under the jurisdiction of the Army and Navy authorities and are not subject to induction under the Selective Service acts. The Army and Navy authorities will defer calling these officers to active duty until they have completed their medical education.

All students who are disqualified physically for commissions should apply for deferment in accordance with the instructions already referred to.

RECENT GRADUATES

After successful completion of his medical college course every individual holding commission as Second Lieutenant, Medical Administrative Corps, Army of the United States, should make immediate application to the Adjutant General, United States Army, Washington, D. C., for appointment as First Lieutenant, Medical or Dental Corps, Army of the United States. Every individual holding commission as Ensign H-V (P), U. S. Naval Reserve, should make immediate application to the commandant of his naval district for commission as Lieutenant (j. g.), Medical or Dental Corps Reserve, U. S. Navy. If appointment is desired in the grade of Lieutenant (j. g.) in the regular Medical Corps or Dental Corps of the U. S. Navy, application should be made to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

The Public Health Service contacts senior and junior medical students for the purpose of interesting the students in applying for positions as interns, following the successful completion of the school year. In addition the students that are accepted are offered commissions in the reserve, to be inactive during the period of their internship and to become active following the successful completion of their internship.

TWELVE MONTHS INTERNS

All interns should apply for commissions as First Lieutenant, Medical or Dental Corps, Army of the United States, or as Lieutenant (j. g.), United States

Navy or Naval Reserve. After completion of twelve months' internship, except in rare instances in which the necessity of continuation as a member of the staff or as a resident can be defended by the institution, all who are physically fit may be required to enter military service. Those commissioned may then expect to enter military service in their professional capacity as medical or dental officers.

HOSPITAL STAFF MEMBERS

Interns with more than twelve months of internship, assistant residents, fellows, residents, junior staff members and staff members under the age of 45 fall within the provisions of the Selective Service acts.

All such men holding Army commissions are subject to call at any time. Temporary deferment is possible if an application made by the institution to the Adjutant General of the United States Army certifying that the individual is temporarily indispensable is approved.

All such men holding Naval Reserve commissions are subject to call at any time, at the discretion of the Secretary of the Navy. Temporary deferments are granted only on approval of applications made by the institution to the Surgeon General of the Navy.

THOSE UNDER 45

All male physicians, dentists or veterinarians under 45 are liable for military service. That their services may be utilized in a professional capacity as officers, they should be made available through the facilities of the Procurement and Assignment Service. Wherever possible, their present positions in civil life should be filled or provisions made for filling their positions, if necessary, by (*a*) those who are over 45, (*b*) those under 45 who are physically disqualified for military service, (*c*) women and (*d*) instructors and those engaged in research who do not possess M.D., D.D.S. or D.V.M. degrees but whose utilization would make available physicians, dentists or veterinarians for military service.

THOSE OVER 45

All physicians, dentists or veterinarians over 45 should enroll with the Procurement and Assignment Service. Every possible effort will be made to retain those who are essential in their present capacities. Those who are available for assignment to military, governmental, industrial or civil agencies may be asked by the Procurement and Assignment Service to serve those agencies.

MAINTAINING EDUCATIONAL, INDUSTRIAL AND CIVILIAN MEDICAL, DENTAL AND VETERINARY SERVICES

Faculties of Schools.—Authorities in medical, dental and veterinary schools have forwarded lists to the Procurement and Assignment Service containing the names of members of their faculties who are considered essential to a proper continuation of medical, dental and veterinary education. These lists will be consulted in determining those who are considered essential. Should the status of any individual listed as essential for teaching be changed, the Procurement and Assignment Service should be immediately notified by the college authorities.

Research.—The burden of proof as to the essential character of research set forth as a reason for deferment rests on the individual and the employing institution. Efforts will be made to maintain without interruption the progress of scientific research, particularly that related to the war effort.

Civil Practice.—The Procurement and Assignment Service will do its utmost to maintain a supply of medical, dental and veterinary services for all industrial and civilian needs. Already the state and county medical, dental and veterinary societies, under the direction of state chairmen, are assembling lists of physicians, dentists and veterinarians considered essential in the positions they now occupy.

ADVISORY COMMITTEES AND LIAISON OFFICERS

On recommendations of the Directing Board of the Procurement and Assignment Service, the Office of Defense, Health and Welfare Services has appointed the following advisory committees and consultants to the Procurement and Assignment Service: Dentistry, Veterinary Medicine, Hospitals, Women Physicians, Industrial Health and Medicine, Medical Education, Negro Physicians and Public Health.

These committees are advisory to the Directing Board in establishing policies regarding the availability and utilization of personnel in their respective fields.

THE COMMITTEE ON INFORMATION

With its consultants, the Committee on Information is charged with disseminating information to all physicians, dentists and veterinarians and to the public in order that they may be kept informed of the progress of the Procurement and Assignment Service, and in order to secure their cooperation in its activities (appendix 1).

LIAISON OFFICERS

Each of the governmental agencies utilizing the services of physicians, dentists and veterinarians has appointed a liaison officer to advise and assist the Procurement and Assignment Service (appendix 1).

SPECIAL INFORMATION

Specialization. — In general, determination as to special qualifications of persons entering the medical services of the Army and Navy depends on the classification of specialists by advisory committees established through the Division of Medical Sciences of the National Research Council and certifications of boards in the various specialtiès. Moreover, the recommendations of state and county committees and the statements of the individuals on questionnaires will be taken into consideration. On questions of dental and veterinary specialization, the official organization will be consulted.

Citizenship.—Regulations of the United States Army and Navy do not permit the commissioning of officers who are not citizens of the United States. A commission in the United States Navy requires full citizenship for a period of ten years, and the ten year period to have been spent in the United States. Similarly, all federal agencies utilizing physicians, dentists and veterinarians now demand citizenship as a prerequisite to such enrolment.

Persons who do not possess full citizenship papers but who have been licensed to practice in any of the states of the United States should enroll with the Procurement and Assignment Service so that their services may be utilized when the opportunity arises. They

should, however, do their utmost to continue in their efforts to secure citizenship to enable them to qualify for positions that they are not able to fill because of lack of these essentials.

Physicians, dentists or veterinarians who have their first citizenship papers but who do not have a license to practice and who are under the age of 45 come within the provisions of the Selective Service acts and may be inducted in the capacity of enlisted men. When this occurs, these should make known their special capacities, so that their services may be utilized to the fullest extent in the medical departments of the Army and Navy in an enlisted capacity.

College Qualifications.—Commissions in the medical departments of the United States Army and Navy and in federal agencies are granted only to graduates of schools recognized by such agencies. For physicians, twelve months of internship or its equivalent is required.

Those wishing further information concerning the qualifications necessary to appear for examination leading to a commission in the Army or Navy or to service with any other governmental service should apply directly to such agency.

Women Physicians, Dentists and Veterinarians.—The United States Army and Navy do not permit the commissioning of women physicians, dentists or veterinarians. However, all should enroll with the Procurement and Assignment Service so that they may be recommended to such positions as are available in other federal agencies, industry or civilian capacities in which their services may be required.

The needs will no doubt be particularly acute in local, state and national institutions, in teaching and staff positions and in special occupations with the Office of Civilian Defense in the care of women and children under emergency conditions.

APPENDIX I.—PROCUREMENT AND ASSIGNMENT SERVICE.—CENTRAL ORGANIZATION

OFFICE OF DEFENSE HEALTH AND WELFARE SERVICES

DIRECTING BOARD

Dr. Frank H. Lahey, Chairman, President, American Medical Association, 605 Commonwealth Avenue, Boston.

Dr. Harvey B. Stone, Vice Chairman, Associate Professor of Surgery, Johns Hopkins University School of Medicine, 18 West Franklin Street, Baltimore.

Dr. C. Willard Camalier, Chairman, Dental Preparedness Committee, American Dental Association, 1726 Eye Street N.W., Washington, D. C.

Dr. Harold S. Diehl, Dean of Medical Sciences, University of Minnesota, Minneapolis.

Dr. James E. Paullin, 384 Peachtree Street N.E., Atlanta, Ga.

Dr. Sam F. Seeley, Executive Officer.

LIAISON OFFICERS

Major Paul A. Paden, M. C., Office of the Surgeon General, War Department, Room 1113-B, 1818 H Street N.W., Washington, D. C.

Commander Thomas B. Mcgath, Medical Officers Reserve Section, U. S. Navy, Washington, D. C.

Dr. Paul M. Stewart, U. S. Public Health Service, 23d and Constitution Avenue N.W., Washington, D. C.

Lieut. Col. Richard H. Eanes, M. C., Selective Service System, Potomac Park Apartment, 21st and C streets N.W., Washington, D. C.

Dr. Hugo Mella, Veterans Administration, Washington, D. C.

Dr. George Baehr, Chief Medical Officer, Office of Civilian Defense, DuPont Circle Building, Washington, D. C. Tel. Republic 5050, Ext. 505.

Dr. Edwin F. Daily, Director, Division of Health Services, Children's Bureau, Department of Labor, Washington, D. C.

Dr. Verne K. Harvey, U. S. Civil Service Commission, Washington, D. C.

ADVISORY COMMITTEES

DENTISTRY

Dr. John T. O'Rourke, Chairman, Dean of Dental School, University of Louisville, Louisville, Ky.

Dr. Leroy M. S. Miner, Vice Chairman, Dean of Dental School, Harvard University, Boston.

Dr. Frederick B. Noyes, 55 E. Washington Street, Chicago.

Dr. Guy S. Millberry, R. F. D. No. 2, Box 181, Los Gatos, Calif.

Dr. B. K. Westfall, 1006 Hume-Mansur Building, Indianapolis.

CONSULTANT

Dr. Gerald D. Timmons, Executive Secretary, American Dental Association, 212 East Superior Street, Chicago.

HOSPITALS

Dr. Winford H. Smith, Chairman, Director, Johns Hopkins Hospital, Baltimore.

Dr. Nathaniel W. Faxon, Vice Chairman, Director, Massachusetts General Hospital, Boston.

Dr. Claude W. Munger, Director, St. Luke's Hospital, 421 W. 113th Street, New York.

Dr. M. T. MacEachern, Associate Director, American College of Surgeons, 40 East Erie Street, Chicago.

Rev. Fr. Alphonse M. Schwitalla, Dean, St. Louis University School of Medicine, 1402 South Grand Boulevard, St. Louis.

INDUSTRIAL HEALTH AND MEDICINE

Dr. C. D. Selby, Chairman, Medical Director, General Motors Corporation, Detroit.

Dr. A. J. Lanza, Vice Chairman, Assistant Medical Director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.

Mr. William Yant, Director of Research and Development, Mine Safety Appliance Company, Braddock, Thomas & Meade streets, Pittsburgh.

Dr. Lloyd Noland, Chief Surgeon, Tennesssee Coal, Iron and Railroad Company, Fairfield, Ala.

Dr. E. C. Holmblad, 28 East Jackson Boulevard, Chicago.

Professor Philip Drinker, Department of Industrial Hygiene, School of Public Health, Harvard University, 55 Shattuck Street, Boston.

Dr. George M. Smith, Department of Anatomy, Yale University School of Medicine, New Haven, Conn.

MEDICAL EDUCATION

Dr. C. Sidney Burwell, Chairman, Dean, Harvard University Medical School, 25 Shattuck Street, Boston.

Dr. William S. Middleton, Vice Chairman, Dean of Medical School, University of Wisconsin, 1300 University Avenue, Madison, Wis.

Dr. Willard C. Rappleye, Dean, College of Physicians and Surgeons, Columbia University, 630 West 168th Street, New York.

Dr. John H. Musser, Professor of Medicine, Tulane University School of Medicine, 1430 Tulane Avenue, New Orleans.

Dr. Loren R. Chandler, Dean, School of Medicine, Stanford University, San Francisco.

NEGRO HEALTH

Dr. M. O. Bousfield, Chairman, Director of Negro Health, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago.

Dr. Russell A. Dixon, Vice Chairman, Dean, College of Dentistry, Howard University, Washington, D. C.

Dr. G. Hamilton Francis, 1024 East Liberty Street, Norfolk, Va.

Mr. A. W. Dent, Superintendent, Flint Goodridge Hospital, New Orleans.

Dr. A. N. Vaughn, Surgeon, Homer G. Philips Hospital, St. Louis.

PUBLIC HEALTH

Dr. Carl V. Reynolds, Chairman, 216 West Jones Street, Raleigh, N. C.

Dr. Harry S. Mustard, Vice Chairman, DeLamar Institute of Public Health, 600 West 168th Street, New York.

Dr. Gaylord West Anderson, University of Minnesota, Minneapolis.

Dr. Waller S. Leathers, School of Medicine, Vanderbilt University, Nashville, Tenn.

Dr. John L. Rice, 125 Worth Street, New York.

VETERINARY MEDICINE

Dr. John G. Hardenbergh, Chairman, Executive Secretary, American Veterinary Medical Association, 600 South Michigan Avenue, Chicago.

Dr. John R. Mohler, Vice Chairman, Chief, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Dr. Harry W. Jakeman, President, American Veterinary Medical Association, 44 Bromfield Street, Boston.

Dr. William A. Hagan, Dean, New York State Veterinary College, Cornell University, Ithaca, N. Y.

Dr. Cassius Way, 25 Vanderbilt Avenue, New York.

WOMEN PHYSICIANS

Dr. Sara Murray Jordan, Chairman, 605 Commonwealth Avenue, Boston.

Dr. Margaret D. Craighill, Vice Chairman, Dean, Woman's Medical College of Pennsylvania, East Falls, Philadelphia.

Dr. Ruth Evelyn Boynton, University of Minnesota, Minneapolis.

Dr. Ada Chree Reid, Executive Secretary, American Medical Women's Association, 102 E. 22d Street, New York.

Dr. Irma Jackson, Forest Hills Inn, Forest Hills, N. Y.

INFORMATION

Dr. Morris Fishbein, Chairman, Editor, Journal American Medical Association, 535 North Dearborn Street, Chicago.

Dr. Ira V. Hiscock, Vice Chairman, Yale University School of Medicine, New Haven, Conn.

Mr. J. J. Bloomfield, Sanitary Engineer, U. S. Public Health Service, National Institute of Health, Bethesda, Md.

Dr. John F. Fulton, Yale University School of Medicine, 333 Cedar Street, New Haven, Conn.

Dr. Richard M. Hewitt, Mayo Clinic, Rochester, Minn.

Dr. Sanford V. Larkey, Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, Washington, D. C.

Dr. Robert N. Nye, Managing Editor, New England Journal of Medicine, 8 Fenway, Boston.

CONSULTANTS

Mr. Watson Davis, 1719 N Street N.W., Washington, D. C.

Mr. David Dietz, Science Editor, Scripps-Howard Newspapers, United Press, Cleveland Press Building, Cleveland.

Mr. William Laurence, New York Times, New York.

Mr. Arthur T. Robb, Editor of Editor and Publisher, 1475 Broadway, New York.

Dr. Gerald D. Timmons, Executive Secretary, American Dental Association, 212 East Superior Street, Chicago.

Dr. John G. Hardenbergh, Executive Secretary, American Veterinary Medical Association, 600 South Michigan Avenue, Chicago.

APPENDIX 2—REGIONAL ORGANIZATIONS

First Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. W. G. Phippen, 31 Chestnut Street, Salem, Mass.

Physicians.—Dr. Deering G. Smith, 77 Main Street, Nashua, N. H.; Dr. Lucius Kingman, 76 Waterman Street, Providence, R. I.

Dentist.—Dr. Philip E. Adams, 106 Marlboro Street, Boston.

Veterinarian.—Dr. R. W. Smith, Concord, N. H.

Hospital Representative.—Dr. Nathaniel Faxon, Massachusetts General Hospital, Boston.

Medical Education Representative.—Dr. C. Sidney Burwell, 25 Shattuck Street, Boston.

STATE CHAIRMEN IN FIRST CORPS AREA

CONNECTICUT

Medical.—Dr. Creighton Barker, 258 Church Street, New Haven.

Dental.—Dr. Louis R. Siegal, 750 Main Street, Hartford.

Veterinary Medical.—Dr. Edwin Laitinen, 993 N. Main Street, West Hartford.

MAINE

Medical.—Dr. John G. Towne, 135 Main Street, Waterville.

Dental.—Dr. Giles C. Grant, 655 Congress Street, Portland.

Veterinary Medical.—Dr. P. R. Baird, 52 Pleasant Street, Waterville.

MASSACHUSETTS

Medical.—Dr. Reginald Fitz, 319 Longwood Avenue, Boston.

Dental.—Dr. Andrew J. Rafferty, 390 Main Street, Worcester.

Veterinary Medical.—Dr. Harrie W. Peirce, 100 Nashua Street, Boston.

NEW HAMPSHIRE

Medical.—Dr. Deering G. Smith, 77 Main Street, Nashua.

Dental.—Dr. William H. Putney, 85 Pleasant Street, Concord.

Veterinary Medical.—Dr. R. W. Smith, State House, Concord.

RHODE ISLAND

Medical.—Dr. Halsey DeWolf, 199 Thayer Street, Providence.

Dental.—Dr. E. C. Elliott, 615 Union Trust Bldg., Providence.

Veterinary Medical.—Dr. J. S. Barber, 560 Pleasant Street, Pawtucket.

VERMONT

Medical.—Dr. Benjamin F. Cook, 46 Nichols Street, Rutland.

Dental.—Dr. Maxwell L. Jameson, 69 Pine Street, Burlington.

Veterinary Medical.—Dr. A. A. Mortimer, 27 Central Street, Randolph.

Second Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. A. W. Booth, 222 West Church Street, Elmira, N. Y.

Physicians.—Dr. Samuel J. Kopetzky, 71 East 80th Street, New York; Dr. W. J. Carrington, 905 Pacific Avenue, Atlantic City, N. J.

Dentists.—Dr. William McG. Burns, 80 Hanson Place, Brooklyn; Dr. Allen T. Newman, 209 East 23d Street, New York.

Veterinarian.—Dr. R. R. Birch, Route 2, Ithaca, N. Y.

Hospital Representative.—Dr. Claude W. Munger, St. Luke's Hospital, New York.

Medical Education Representative.—Dr. Willard C. Rappleye, Columbia University Medical School, New York.

STATE CHAIRMEN IN SECOND CORPS AREA

DELAWARE

Medical.—Dr. William H. Speer, 917 Washington Street, Wilmington.

Dental.—Dr. William Stewart, Medical Arts Building, Wilmington.

Veterinary Medical.—Dr. Harry McDaniel Jr., State Board of Agriculture, Dover.

NEW JERSEY

Medical.—Dr. Charles H. Schlichter, 143 E. State Street, Trenton.

Dental.—Dr. E. C. Stillwell, 815 Bloomfield, Glen Ridge.

Veterinary Medical.—Dr. A. W. Smith, 8 Longview Road, Livingston.

NEW YORK

Medical.—Dr. Samuel J. Kopetzky, 71 E. 80th Street, New York.

Dental.—Dr. William McG. Burns, 80 Hanson Place, Brooklyn.

Veterinary Medical.—Dr. Albert L. Brown, Route 1, Adams.

Third Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. A. M. Shipley, University Hospital, Baltimore.

Physicians.—Dr. C. H. Henninger, 500 Penn Avenue, Pittsburgh; Dr. Hugh H. Trout, 1301 Franklin Road, Roanoke, Va.

Dentists.—Dr. B. Lucien Brun, 827 Park Avenue, Baltimore; Dr. Harry Bear, 410 Professional Bldg., Richmond, Va.

Veterinarian.—Dr. Mark Welsh, College Park, Md.

Hospital Representative.—Dr. Winford H. Smith, Johns Hopkins Hospital, Baltimore.

Medical Education Representative.—Dr. William Pepper, University of Pennsylvania School of Medicine, Philadelphia.

STATE CHAIRMEN IN THIRD CORPS AREA

MARYLAND

Medical.—Dr. Charles W. Maxson, 827 N. Charles Street, Baltimore.

Dental.—Dr. T. J. Bland, Medical Arts Building, Baltimore.

Veterinary Medical.—Dr. A. L. Brueckner, College Park.

PENNSYLVANIA

Medical.—Dr. Charles H. Henninger, 500 Penn Avenue, Pittsburgh.

Dental.—Dr. R. H. Nones, 1930 Chestnut Street, Philadelphia.

Veterinary Medical.—Dr. Ernest W. Hogg, 20 Darling Street, Wilkes-Barre.

VIRGINIA

Medical.—Dr. Hugh H. Trout, 1301 Franklin Road, Roanoke.

Dental.—Dr. J. H. John, Medical Arts Bldg., Roanoke.

Veterinary Medical.—Dr. I. D. Wilson, Virginia Polytechnic Institute, Blacksburg.

DISTRICT OF COLUMBIA

Medical.—Dr. Francis X. McGovern, 1835 Eye Street N.W., Washington, D. C.

Dental.—Dr. George Albert Smith, 1835 Eye Street N.W., Washington, D. C.

Veterinary Medical.—Dr. A. E. Wight, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Fourth Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. Edgar Greene, 478 Peachtree Street N.E., Atlanta, Ga.

Physicians.—Dr. Alfred A. Walker, 2250 Highland Avenue, Birmingham, Ala.; Dr. Edward H. Jelks, P. O. Box 1018, Jacksonville, Fla.

Dentists.—Dr. Claude R. Wood, 606 Medical Arts Building, Knoxville, Tenn.; Dr. Ralph R. Byrnes, 106 Forest Avenue N.E., Atlanta, Ga.

Veterinarian.—Dr. B. T. Simms, Regional Animal Disease Research Laboratory, Auburn, Ala.

Hospital Representative.—Dr. J. Moss Beeler, Grady Hospital, Atlanta, Ga.

Medical Education Representative.—Dr. R. H. Oppenheimer, 50 Armstrong Street, Atlanta, Ga.

STATE CHAIRMEN IN FOURTH CORPS AREA

ALABAMA

Medical.—Dr. B. F. Austin, 519 Dexter Avenue, Montgomery.

Dental.—Dr. C. B. Bray, American Cast Iron Pipe Company, Birmingham.

Veterinary Medical.—Dr. R. S. Sugg, School of Veterinary Medicine Alabama Polytechnic Institute, University.

FLORIDA

Medical.—Dr. Edward Jelks, Box 1018, Jacksonville.

Dental.—Dr. E. C. Lunsford, 126 W. San Marius, Miami.

Veterinary Medical.—Dr. J. L. Ruble, 1600 N. Orange Ave., Orlando.

GEORGIA

Medical.—Dr. Edgar H. Greene, 478 Peachtree Street N.E., Atlanta.

Dental.—Dr. R. H. Murphy, 920 Persons Building, Macon.

Veterinary Medical.—Dr. J. M. Sutton, Sylvester.

LOUISIANA

Medical.—Dr. C. Grenes Cole, 921 Canal Street, New Orleans.

Dental.—Dr. Larry Dupuy, 837 Maison Blanche Building, New Orleans.

Veterinary Medical.—Dr. E. P. Flower, Box 24, Baton Rouge.

MISSISSIPPI

Medical.—Dr. T. M. Dye, Box 295, Clarksdale.

Dental.—Dr. George P. Evans, Standard Life Building, Jackson.

Veterinary Medical.—Dr. E. S. Brashier, State Vet. & Exec. Off., Mississippi State Live Stock San. Bd., Jackson.

NORTH CAROLINA

Medical.—Dr. Hubert B. Haywood, 127 W. Hargett Street, Raleigh.

Dental.—Dr. H. O. Lineberger, 804 Professional Building, Raleigh.

Veterinary Medical.—Dr. William Moore, State Veterinarian, Raleigh.

SOUTH CAROLINA

Medical.—Dr. W. L. Pressly, Due West.

Dental.—Dr. E. W. Sheperd, Spartanburg.

Veterinary Medical.—Dr. R. A. Mays, J. C. Calhoun State Office Building, Columbia.

TENNESSEE

Medical.—Dr. W. C. Dixon, 706 Church Street, Nashville.

Dental.—Dr. Lawrence T. Kennedy, Medical Arts Building, Knoxville.

Veterinary Medical.—Dr. M. Jacob, University of Tennessee, Knoxville.

Fifth Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. E. L. Henderson, 606 S. 4th Street, Louisville, Ky.

Physicians.—Dr. Robert Conard, Hartman Theater Building, Columbus, Ohio; Dr. Larue Carter, 1820 E. 10th Street, Indianapolis.

Dentists.—Dr. Earl D. Lowry, 79 E. State Street, Columbus, Ohio; Dr. Wendell D. Postle, 1714 N. High Street, Columbus, Ohio.

Veterinarian.—Dr. A. F. Schalk, Ohio State University, Columbus, Ohio.

Hospital Representative.—Dr. Robert H. Bishop, 2065 Adelbert Road, Cleveland.

Medical Education Representative.—Dr. Hardy A. Kemp, Ohio State University Medical School, Columbus, Ohio.

STATE CHAIRMEN IN FIFTH CORPS AREA

INDIANA

Medical.—Dr. Charles R. Bird, 23 E. Ohio Street, Indianapolis.

Dental.—Dr. H. T. Berkey, Wayne Pharmacal Building, Fort Wayne.

Veterinary Medical.—Dr. Charles C. Dobson, New Augusta.

KENTUCKY

Medical.—Dr. Arthur T. McCormack, 620 S. 3d Street, Louisville.

Dental.—Dr. E. C. Hume, Heyburn Building, Louisville.

Veterinary Medical.—Dr. Arthur J. Kay, 517 Murray Street, Frankfort.

OHIO

Medical.—Dr. Robert Conard, Hartman Theater Building, Columbus.

Dental.—Dr. Frank C. Starr, 150 E. Broad Street, Columbus.

Veterinary Medical.—Dr. D. C. Hyde, 1700 Arlington Avenue, Columbus.

WEST VIRGINIA

Medical.—Dr. R. H. Walker, 240 Capitol Street, Charleston.

Dental.—Dr. Ira J. Kail, 1018 First National Bank Bldg., Huntington.

Veterinary Medical.—Dr. H. M. Newton, P. O. Box 1721, Charleston.

Sixth Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. Charles H. Phifer, 30 North Michigan Avenue, Chicago.

Physicians.—Dr. P. R. Urmston, 916 Washington Avenue, Bay City, Mich.; Dr. Stephen E. Gavin, 104 South Main Street, Fond du Lac, Wis.

Dentists.—Dr. Leo Kremer, 55 East Washington Street, Chicago; Dr. Paul H. Jeserich, W. K. Kellogg Institute, Ann Arbor, Mich.

Veterinarian.—Dr. Ward Giltner, Michigan State College, East Lansing, Mich.

Hospital Representative.—Mr. Joseph G. Norby, Columbia Hospital, Milwaukee.

Medical Education Representative.—Dr. A. C. Bachmeyer, 950 East 59th Street, Chicago.

STATE CHAIRMEN IN SIXTH CORPS AREA

ILLINOIS

Medical.—Dr. Harold M. Camp, 2245 South Main Street, Monmouth.

Dental.—Dr. William I. McNeil, 59 East Madison Street, Chicago.

Veterinary Medical.—Dr. A. E. Bott, 1317 Pennsylvania Ave, East St. Louis.

MICHIGAN

Medical.—Dr. P. R. Urmston, 916 Wash. Avenue, Bay City.

Dental.—Dr. J. O. Goodsell, 2nd Nat. Bank Building, Saginaw.

Veterinary Medical.—Dr. B. J. Killham, Michigan State College, East Lansing.

WISCONSIN

Medical.—Dr. R. E. Fitzgerald, 2750 North Teutonia Avenue, Milwaukee.

Dental.—Dr. Charles Baumann, 408 West Greenfield Avenue, Milwaukee.

Veterinary Medical.—Dr. W. Wisnicky, University of Wisconsin, Madison.

Seventh Corps Area

CORPS AREA COMMITTEE

Chairman.—Dr. Roy W. Fouts, 107 South 17th Street, Omaha.

Physicians.—Dr. F. L. Loveland, 109 West 9th Street, Topeka, Kan.; Dr. Robert L. Parker, 3510 6th Avenue, Des Moines, Iowa.

Dentists.—Dr. F. A. Pierson, 1112 Federal Security Building, Lincoln, Neb.; Dr. A. W. Bryan, Box 727, Iowa City.

Veterinarian.—Dr. H. D. Bergman, Iowa State College, Ames, Iowa.

Hospital Representative.—Mr. Robert E. Neff, University Hospital, Iowa City.

Medical Education Representative.—Dr. C. W. N. Poynter, 42d Street and Dewey Avenue, Omaha.

STATE CHAIRMEN IN SEVENTH CORPS AREA

ARKANSAS

Medical.—Dr. W. R. Brooksher, 602 Garrison Avenue, Fort Smith.

Dental.—Dr. I. M. Sternberg, 1st National Bank Building, Fort Smith.

Veterinary Medical.—Dr. Joe S. Campbell, Route 4, Little Rock.

IOWA

Medical.—Dr. T. F. Suchomel, 305 2d Street, Cedar Rapids.

Dental.—Dr. John Voss, Voss Building, Iowa City.

Veterinary Medical.—Dr. A. R. Menary, 1721 Blake Boulevard, Cedar Rapids.

KANSAS

Medical.—Dr. F. L. Loveland, 109 West 9th Street, Topeka.

Dental.—Dr. John W. Richmond, Huron Building, Kansas City.

Veterinary Medical.—Dr. R. R. Dykstra, Kansas State College, Manhattan.

MINNESOTA

Medical.—Dr. William F. Braasch, 102 2d Street, Rochester.

Dental.—Dr. J. P. Werrick, Medical Arts Building, Minneapolis.

Veterinary Medical.—Dr. C. E. Cotton, 3145 Portland Avenue, Minneapolis.

MISSOURI

Medical.—Dr. Robert Mueller, 3115 South Grand Avenue, St. Louis.

Dental.—Dr. R. J. Rinehart, K. C. Western Dental College, Kansas City.

Veterinary Medical.—Dr. S. W. Haigler, 7645 Delmar Boulevard, St. Louis.

NEBRASKA

Medical.—Dr. A. A. Conrad, Crete.

Dental.—Dr. Lawrence A. Donahoe, 1128 City National Bank Building, Omaha.

Veterinary Medical.—Dr. W. T. Spencer, Livestock Exchange Building, Omaha.

NORTH DAKOTA

Medical.—Dr. L. W. Larson, 221 5th Street, Bismarck.

Dental.—Dr. A. O. Schjeldahl, 523½ 5th Avenue, Valley City.

Veterinary Medical.—Dr. R. E. Shigley, 710 2d Street S.E., Minot.

SOUTH DAKOTA

Medical.—Dr. William Duncan, Webster.

Dental.—Dr. R. W. Ellis, Salem.

Veterinary Medical.—Dr. D. L. Cotton, Beresford.

WYOMING

Medical.—Dr. George H. Phelps, 1606 Capitol Avenue, Cheyenne.

Dental.—Dr. L. C. Hunt, 308 West 3d Avenue, Cheyenne.

Veterinary Medical.—Dr. H. D. Port, 304 Capitol Building, Cheyenne.

EIGHTH CORPS AREA

CORPS AREA COMMITTEE

Chairman.—Dr. Sam E. Thompson, Kerrville, Texas.

Physicians.—Dr. Holman Taylor, 1404 West El Paso Street, Fort Worth, Texas; Dr. John W. Amesse, 227 16th Street, Denver.

Dentists.—Dr. T. G. Duckworth, 915 Medical Arts Building, San Antonio, Texas; Dr. Fred C. Elliott, 1018 Blodgett Avenue, Houston, Texas.

Veterinarian.—Dr. M. B. Starnes, City Health Department, Dallas Texas.

Hospital Representative.—Mr. Frank Walter, St. Luke's Hospital, Denver.

Medical Education Representative.—Dr. Maurice H. Rees, 4200 East 9th Avenue, Denver.

STATE CHAIRMEN IN EIGHTH CORPS AREA

ARIZONA

Medical.—Dr. Charles S. Smith, Nogales.

Dental.—Dr. W. A. Baker, Professional Building, Phoenix.

Veterinary Medical.—Dr. T. B. Jones, 105 Capitol Building, Phoenix.

COLORADO

Medical.—Dr. John Amesse, 227 16th Street, Denver.

Dental.—Dr. E. M. Silverberg, 809 Republic Building, Denver.

Veterinary Medical.—Dr. Floyd Cross, Colorado State College, Fort Collins.

NEW MEXICO

Medical.—Dr. L. B. Cohenour, 221 Central Avenue, Albuquerque.

Dental.—Dr. H. R. Chapin, El Moro Building, Gallup.

Veterinary Medical.—Dr. S. W. Wiest, Box 75, Santa Fe.

OKLAHOMA

Medical.—Dr. Henry H. Turner, 1200 North Walker, Oklahoma City.

Dental.—Dr. A. C. Seids, 1200 North Walker, Oklahoma City.

Veterinary Medical.—Dr. L. J. Allen, 1610 North Ellison, Oklahoma City.

TEXAS

Medical.—Dr. Holman Taylor, 1404 West El Paso Street, Fort Worth.

Dental.—Dr. J. E. Robinson, Medical Arts Building, San Antonio.

Veterinary Medical.—Dr. T. O. Booth, 2002 W. T. Waggoner Building, Fort Worth.

NINTH CORPS AREA

CORPS AREA COMMITTEE

Chairman.—Dr. Charles A. Dukes, 426 17th Street, Oakland, Calif.

Physicans.—Dr. John H. Fitzgibbon, 812 S.W. Washington, Portland, Ore.; Dr. John M. O'Shea, 422 Riverside Avenue, Spokane, Wash.

Dentists.—Dr. B. C. Kingsbury, 490 Post Street, San Francisco; Dr. E. O. Sloman, 344 14th Street, San Francisco.

Veterinarian.—Dr. C. M. Haring, University of California, Berkeley, Calif.

Hospital Representative.—Dr. Benjamin W. Black, 2701 14th Avenue, Oakland, Calif.

Medical Education Representative.—Dr. Loren R. Chandler, Stanford University, School of Medicine, San Francisco.

STATE CHAIRMEN IN NINTH CORPS AREA

CALIFORNIA

Medical.—Dr. Harold A. Fletcher, 490 Post Street, San Francisco.

Dental.—Dr. Kenneth Ruedy, 3780 Wilshire Boulevard, Los Angeles; Dr. John W. Leggett, 490 Post Street, San Francisco.

Veterinary Medical.—Dr. Joseph M. Arburua, 26 Fell Street, San Francisco.

IDAHO

Medical.—Dr. F. M. Cole, Caldwell.

Dental.—Dr. J. E. Bennett, Idaho Falls.

Veterinary Medical.—Dr. Arthur P. Schneider, 2519 Boise Ave., Boise.

MONTANA

Medical.—Dr. Herbert Caraway, 115 North 28th Street, Billings.

Dental.—Dr. D. H. McCauley, 9 First Avenue, Laurel.

Veterinary Medical.—Dr. W. J. Butler, % Capitol Station, Helena.

NEVADA

Medical.—Dr. C. W. West, 120 North Virginia Street, Reno.

Dental.—Dr. G. C. Steinmiller, Masonic Temple, Reno.

Veterinary Medical.—Dr. Edward Records, University of Nevada, Reno.

OREGON

Medical.—Dr. Wilson Johnston, 1020 S.W. Taylor Street, Portland.

Dental.—Dr. N. L. Zimmerman, Medical Dental Building, Portland.

Veterinary Medical.—Dr. Fred W. Lange, 855 Belmont Street, Salem.

UTAH

Medical.—Dr. John F. Sharp, 75 S. Main, Salt Lake City.

Dental.—Dr. C. O. Robinson, Medical Arts Building, Salt Lake City.

Veterinary Medical.—Dr. W. H. Hendricks, 1419 East 17th South Street, Salt Lake City.

WASHINGTON

Medical.—Dr. Raymond Zech, 509 Olive Way, Seattle.

Dental.—Dr. L. L. Foote, Medical & Dental Building, Seattle.

Veterinary Medical.—Dr. M. O. Barnes, 203 Federal Building, Olympia.

APPENDIX 3.—ADDRESSES OF NAVAL COMMANDANTS

The addresses of commandants of the several naval districts and the limits of their jurisdiction as far as Naval Reserve is concerned are:

Commandant, 1st Naval District, North Station Office Building, 150 Causeway Street, Boston. (States of Maine, Massachusetts, New Hampshire, Vermont, and Rhode Island, including Block Island.)

Commandant, 3d Naval District, Federal Building, 90 Church Street, New York. (States of New York, Connecticut, and upper New Jersey, including counties of Mercer, Monmouth, and all counties north thereof, also Nantucket Shoals Lightship.)

Commandant, 4th Naval District, Navy Yard, Philadelphia. (States of Pennsylvania, southern part of New Jersey, including counties of Burlington, Ocean, and all counties south thereof; Delaware, including Winters Quarter Shoal Light Vessel.)

Commandant, 5th Naval District, Naval Operating Base, Norfolk, Va. (States of Maryland, except Prince Georges, Montgomery, and Charles Counties; Virginia, except Arlington, Fairfax, Stafford, King George, and Prince William Counties, and the city of Alexandria; West Virginia, and the counties of Currituck, Camden, Pasquotank, Gates, Perquimans, Chowan, Dare, Tyrrell, Washington, Hyde, Beaufort, Pamlico, Craven, Jones, Carteret and Onslow in North Carolina, also the Diamond Shoal Lightship.)

Commandant, 6th Naval District, Navy Yard, Charleston, S. C. (States of South Carolina, Georgia, and North Carolina, except the counties of Currituck, Camden, Pasquotank, Gates, Perquimans, Chowan, Dare, Tyrrell, Washington, Hyde, Beaufort, Pamlico, Craven, Jones, Carteret and Onslow.)

Commandant, 7th Naval District, Naval Station, Key West, Fla. (State of Florida, except counties west of Apalachicola River.)

Commandant, 8th Naval District, Federal Building, New Orleans, La. (States of Alabama, Tennessee, Louisiana, Mississippi, Arkansas, Oklahoma, Texas, and Florida, except counties east of Apalachicola River.)

Commandant, 9th Naval District, Naval Training Station, Great Lakes, Ill. (States of Ohio, Michigan, Kentucky, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.)

Commandant, 10th Naval District, San Juan, P. R. (All island possessions of the United States pertaining to Puerto Rico and the Virgin Islands.)

Commandant, 11th Naval District, Naval Operating Base, San Diego, Calif. (States of New Mexico, Arizona, southern part of California, including counties of Santa Barbara, Kern, and San Bernardino, and all counties south thereof.)

Commandant, 12th Naval District, 1095 Market Street, San Francisco, Calif. (States of Colorado, Utah, Nevada, northern part of California, including counties of San Luis Obispo, Kings, Inyo, and Tulare and all counties north thereof.)

Commandant, 13th Naval District, Exchange Building, Seattle, Wash. (States of Washington, Oregon, Idaho, Montana, Wyoming, and Territory of Alaska.)

Commandant, 14th Naval District, Navy Yard, Pearl Harbor, T. H. (Hawaiian Island, and islands westward, including Midway.)

Commandant, 15th Naval District, Naval Station, Balboa, C. Z. (Panama Canal Zone.)

Commandant, 16th Naval District, Naval Station, Cavite, P. I. (Philippine Islands.)

Commandant, Navy Yard, Washington, D. C. (District of Columbia, Prince Georges, Montgomery, and Charles Counties, Maryland; and Arlington, Fairfax, Stafford, King George, and Prince William Counties, Virginia, and the city of Alexandria, Va.)

PHYSICIANS WANTED FOR BLOOD DONOR SERVICES

The Red Cross Blood Donor Service, collecting blood for the Army, Navy and civilian defense, requires for its expanded program about twenty more physicians to be in charge of blood procurement teams. Both men and women are acceptable. Those with recent hospital experience with blood transfusions are preferred. These physicians are employed on a full time basis and work under the direction of the technical supervisor of each center appointed by the National Research Council. Application should be made by writing to the technical supervisor of the nearest blood donor center, giving medical school, year of graduation, age, sex, hospital experience, status relative to military service and other facts that may have bearing on the applicant's qualifications. Application may be made to the following:

Dr. Sidney O. Levinson, Samuel Deutsche Convalescent Serum Center, 2912 Ellis Avenue, Chicago.
Dr. Paul W. Searles, Buffalo General Hospital, Buffalo.
Dr. Warren Cooksey, 62 Kirby Avenue, West, Detroit.
Dr. Paul I. Hoxworth, Cincinnati General Hospital, Cincinnati.
Dr. C. M. Hyland, 4524 Sunset Boulevard, Los Angeles.
Dr. Carl W. Walter, Harvard Medical School, Boston.
Dr. John R. Upton, San Francisco County Medical Society, 2180 Washington Street, San Francisco.
Dr. Maurice Hardgrove, Columbia Hospital, Milwaukee.
Dr. Frank H. Evans, 121 University Place, Pittsburgh.
Dr. Warfield M. Firor, Johns Hopkins Hospital, Baltimore.
Dr. Aims C. McGuinness, Children's Hospital, Philadelphia.
Dr. Carl Lenhart, 2065 Adelbert Road, Cleveland.
Dr. Clyde G. Culbertson, Indiana University Medical School, Indianapolis.
Dr. Earl S. Taylor, Box 200, Presbyterian Hospital, New York.
Dr. Carl V. Moore, Blood Donor Service, St. Louis Chapter ARC, 1007 Olive Street, St. Louis.
Dr. Earle Mahoney, Strong Memorial Hospital, 260 Crittendon Boulevard, Rochester, N. Y.

It is the policy of the directing board of the Procurement and Assignment Service that these positions be filled by men over the age of 45, or those under 45 who are physically disqualified for military service, and that women physicians be employed wherever possible. This is necessary in order that the Procurement and Assignment Service may not be required to request these men for military service should the need become acute.

It is the sense of the directing board that when these positions can be filled by men over 45 the board should not be asked to seek permanent deferment from the provisions of the Selective Service acts for those men under 45 who are physically qualified for military service.

COURSE FOR AVIATION MEDICAL EXAMINERS

A routine course of instruction to qualify medical officers for duty as aviation medical examiners began at the School of Aviation Medicine, Randolph Field, Texas, on January 5. The course will continue for three months. The names of the officers enrolled, together with the stations to which they are assigned, follows:

ADAMS, John M., Captain, Fort Lewis, Wash.
AGIN, Lambert J., 1st Lieut., Selfridge Field, Mich.
AKRE, Osmund H., 1st Lieut., McChord, Field, Wash.
ALEXANDER, Martin M., 1st Lieut., Floyd Bennett Field, N. Y.
ALLISON, Olaf W., 1st Lieut., A. C. B. F. S., Enid, Okla.
ANDERSON, Robert C., Captain, Randolph Field, Texas.
ANSPACH, Royal S., Major, Camp Claiborne, La.
BACKER, Max B., 1st. Lieut., Langley Field, Va.
BARKER, John D., 1st Lieut., Portland Air Base, Portland, Ore.
BERGENER, Karl L., 1st Lieut., Fort Huachuca, Ariz.
BESS, George C., Captain, Fort Lewis, Wash.
BEST, Marshall M., Captain, Fort Bragg, N. C.
BLALOCK, John F., Jr., 1st Lieut., Camp Wheeler, Ga.
BLOCK, Richard M., 1st Lieut., Fort Bragg, N. C.
BODEN, Herbert N., 1st Lieut., Fresno Air Base, Fresno, Calif.
BRASELTON, Charles W., Jr., 1st Lieut., Fort Bliss, Texas.
CAMPBELL, George M., 1st Lieut., Randolph Field, Texas.
CAMPBELL, Kenneth D., 1st Lieut., Manchester Air Base, Manchester, N. H.
CAMPBELL, William J., 1st Lieut., Fort Sam Houston, Texas.
CARTER, William H., 1st Lieut., Sheppard Field, Texas.
CLEARY, Frank, 1st Lieut., Hamilton Field, Calif.
CORO, Roberto Covas y, Lieut. Dr., Cuban Army Reserve, Air Corps.
CRAGO, Felix H., Captain, Fort Lewis, Wash.
DAVIS, William, 1st Lieut., 44th Division, Fort Dix, N. J.
DEVEREUX, James A., Captain, A. C. A. F. S. No. 7, Higley, Ariz.
DIXON, John R., 1st Lieut., Ellington Field, Texas.
DOW, Charles H., 1st Lieut., Fort George G. Meade, Md.
ELLIOTT, Grant R., Major, Savannah Air Base, Savannah, Ga.
FIALLOS, Juan Manuel, Major, Honduran Army.
FIXOTT, Richard S., Captain, Fort Lewis, Wash.
FORD, Sylvester C., 1st Lieut., West Virginia Induction Station, Huntington, W. Va.
GADDIS, Herman W., Captain, Fort Sam Houston, Texas.
GANS, Edward W., 1st Lieut., Stockton Field, Calif.
GUILFORD, Frederick R., 1st Lieut., Ellington Field, Texas.
HARTNETT, Dalton C., 1st Lieut., Fort Sam Houston, Texas.
HARVEY, Arch D., 1st Lieut., Patterson Field, Fairfield, Ohio.
HAW, Marvin T., Jr., Captain, Air Base, Fresno, Calif.
HECKER, Robert C., Captain, Fort Meade, Md.
HEFFNER, Edward A., Captain, Camp Bowie, Texas.
HELLMANN, Robert S., Captain, Tyndall Field, Fla.
HENRY, Joseph R., 1st Lieut., Chanute Field, Ill.
HINN, George J., 1st Lieut., Muroc Bombing and Gunnery Range, Muroc, Calif.
HOPSON, George, 1st Lieut., Geiger Field, Wash.
HOWERTON, Ernest E., Captain, Camp Bowie, Texas.
HUBBARD, Oscar E., Captain, Fort Bragg, N. C.
HUDSON, Lawrence B., Captain, Camp Blanding, Fla.
HYLAN, Nathan W., 1st Lieut., Fort Williams, Maine.
JACKSON, William M., Captain, Fort Bragg, N. C.
JORDAN, Ralph E., 1st Leut., Moffett Field, Calif.
KAPLAN, Hyman J., Captain, Kelly Field, Texas.
KELSEY, Mavis P., 1st Lieut., Portland Air Base, Portland, Ore.
KNAUF, George M., 1st Lieut., A. C. T. D., Rising Sun School of Aeronautics, Philadelphia.
LAMB, Roland D., Captain, Camp Blanding, Fla.
LAYDON, Milton, 1st Lieut., Recruiting and Induction Service, San Francisco.
LOUGHRAN, Fred J., 1st Lieut., Windsor Locks Air Base, Windsor Locks, Conn.
MacMEILL, Arthur E., 1st Lieut., Gowon Field, Boise, Idaho.
MAGNESS, Stephen L., 1st Lieut., Fort George G. Meade, Md.
MANNING, John J., 1st Lieut., Mather Field, Calif.
MANTZ, Harry E., 1st Lieut., Maxwell Field, Ala.
MARDER, Samuel H., 1st Lieut., Maxwell Field, Ala.
MERRIMAN, George J., Jr., 1st Lieut., Brooks Field, Texas.
MICKAL, Abe, 1st Lieut., Fort Bragg, N. C.
MORAN, John A., 1st Lieut., Langley Field, Va.
MUELLER, Paul F., 1st Lieut., Drew Field, Fla.
MUNAL, Harold D., 1st Lieut., A. C. B. F. S., Bakerafield, Calif.
NELSON, Irving, 1st Lieut., Jackson Air Base, Jackson, Miss.
NEWELL, Robert H., 1st Lieut., Scott Field, Ill.
NUERNBERGER, Robert E., 1st Lieut., Camp Barkeley, Texas.
OETJEN, Leroy H., Captain, MacDill Field, Fla.
OLIVER, Ernest B., 1st Lieut., Camp Shelby, Miss.
OWERS, Albert 1st Lieut., Camp Wolters, Texas.
PAINE, Wilmer H., Captain, 47th Field Artillery, Fort Bragg, N. C.
PERRY, Alvin L., 1st Lieut., William Beaumont Hospital, El Paso, Texas.
PINGER, Robert R., 1st Lieut., Pendleton Air Base, Pendleton, Ore.
RANDALL, Ross G., 1st Lieut., Paine Field, Everett, Wash.
REEH, Merrill J., Captain, Randolph Field, Texas.
REINUS, Francis Z., 1st Lieut., Daniel Field, Augusta, Ga.
RICE, Dale A., 1st Lieut., Office Chief of Air Corps, Washington, D. C.
ROBINSON, Howard, Captain, 29th Infantry, Fort Benning, Ga.
ROBINSON, Leo D., 1st Lieut., McChord Field, Wash.
ROSE, Frederick A., 1st Lieut., Paine Field, Everett, Wash.
ROY, Joseph L., Captain, Camp Edwards, Mass.
RUSSELL, Ralph E., Captain, 207 General Hospital, Camp Livingston, La.
RYTERBAND, Louis, 1st Lieut., Jackson Air Base, Jackson, Miss.
SCHUMACHER, Edward R., 1st Lieut., Charlotte Army Air Base, Charlotte, N. C.
SHAW, Jesse W., 1st Lieut., Will Rogers Field, Okla.
SHEPPERD, Lewis A., 1st Lieut., Kelly Field, Texas.
SHULLER, Thurman, 1st Lieut., Air Corps Gunnery School, Las Vegas, Nev.
SIMPSON, Robert C., Captain, 99th Field Artillery, Edgewood Arsenal, Md.
SMITH, Thomas W., 1st Lieut., Fort Hancock, N. J.
SOSSON, Edward, 1st Lieut., Will Rogers Field, Okla.
SPINELLI, Vincent A., 1st Lieut., Westover Field, Mass.
STANSBURY, Frederick C., 1st Lieut., Fort Bragg, N. C.
SUTTON, James A., 1st Lieut., Keesler Field, Miss.
TALBOTT, Charles H., 1st Lieut., 213th General Hospital, Camp Bowie, Texas.
TEAL, Ralph C., Captain, McClellan Field, Calif.
WALDORF, Frank B., 1st Lieut., Mitchel Field, N. Y.
WALLACE, Warren S., 1st Lieut., Langley Field, Va.
WASHBURN, William W., Captain, Camp Blanding, Fla.
WATSON, James R., Jr., Captain, Camp Livingston, La.
WEINSTEIN, Roy C., 1st Lieut., Muroc Bombing and Gunnery Range, Muroc, Calif.
WEISBERG, Rapheal J., 1st Lieut., Langley Field, Va.
WOODALL, Paul S., Captain, Orlando Air Base, Orlando, Fla.
WOODWORTH, John A., 1st Lieut., Mitchel Field, N. Y.
YOUNG, Leslie W., 1st Lieut., Selfridge Field, Mich.
ZAMPETTI, Herman A., Captain, Fort Logan, Colo.
ZEITHAML, Carl E., 1st Lieut., Paine Field, Everett, Wash.

CIVILIAN DEFENSE PLANS IN NEW YORK CITY

In reporting on the civilian defense program for New York City, Mayor LaGuardia is reported to have said, January 18, that the city has been divided into seven medical control districts, under the supervision of Dr. Edward M. Bernicker, chief of the emergency medical service. The borough chiefs, their control stations and the number of report centers under their command are as follows:

Manhattan—Dr. Condict W. Cutler Jr, East Division: Firehouse, 157 East Sixty-Seventh Street; fourteen report centers. West Division: Police station, 306 West Fifty-Fourth Street; thirteen report centers.

Brooklyn—Dr. Thomas A. McGoldrick. East Division: Police station, 421 Empire Boulevard; seventeen report centers. West Division: Power plant, Sixth Avenue and Bergen Street; thirteen report centers.

Bronx—Dr. Edward R. Cunniffe, power plant, 1925 Bathgate Avenue; eleven report centers.

Queens—Dr. Harry P. Mencken, Queens Police Headquarters, 168th Street and Ninety-First Avenue, Jamaica; fourteen report centers.

Richmond—Dr. Herbert A. Cochrane, auxiliary power station, 78-82 Richmond Terrace, St. George; three report centers.

According to the New York *Times*, Mayor LaGuardia said that the following projects and training programs already had been instituted by the Emergency Medical Service:

"1. Field units at eighty hospitals, comprising 204 day and night squads, 716 medical teams with a total personnel of 2,140 resident doctors, nurses and volunteer nurses' aides. A medical team normally consists of a doctor, a nurse and a nurse's aide.

"2. Selected 5,248 casualty stations throughout the city in or immediately adjacent to every important industrial, commercial and residential center.

"3. Set up medical depots for the storage of reserve supplies of stretchers, blankets, collapsible cots, serum, blood banks and splints.

"4. Training schools for volunteer nurses' aides at fifty-two hospitals to provide ten thousand trained women to supplement regular nurses on duty in hospital wards, field service, clinics, school and public health stations.

"5. Drafted plans for the evacuation of chronic patients to the hospitals outside the city and designated key hospitals in certain areas as casualty hospitals for the mass handling of critically injured.

"The eighty hospitals which have medical field units, drilled, equipped and ready for duty anywhere in their districts at any hour of the day or night, are spread about the five boroughs in this way:

	Hospitals	Squads	Resident Personnel
Manhattan	37	168	1,096
Bronx	7	22	240
Brooklyn	21	46	464
Queens	9	19	174
Richmond	6	15	150

"Each squad is made up of doctors, nurses, nurses' aides and orderlies, varying in size from two each in the smaller hospitals to four and six each in the larger institutions. Each squad will have its own leader and transportation in the form of one or two ambulances, trucks and station wagons."

The American Red Cross and other volunteer agencies are instructing two hundred thousand air raid wardens and twenty-four thousand auxiliary firemen in first aid. The emergency medical service has organized ready for this service eleven thousand physicians, fifteen thousand hospital nurses, ten thousand graduate nurses in private practice and one thousand private and public ambulances. There is still need, the mayor said, for five thousand women to take the nurses' aid training program to fit themselves to supplement the work of graduate nurses.

HOSPITAL UNITS ORDERED TO ACTIVE SERVICE

The Second, Twelfth and Twenty-Sixth U. S. Army General Hospital units and the Seventy-Third Evacuation Hospital unit have been activated and ordered into military service. The Second General Hospital unit, under the command of Col. Paul M. Crawford, M. C., enters active service from the Presbyterian Hospital, New York City, and has been ordered to Fort Meade, Md., for training. The Twelfth General Hospital unit from Northwestern University, Chicago, commanded by Col. John H. Sturgeon, M. C., has been ordered to Fort Custer, Mich., and the Twenty-Sixth General Hospital unit, under the command of Lieut. Col. Floyd V. Kilgore, M. C., has been ordered to Fort Snelling, Minn. The Seventy-Third Evacuation Hospital unit, Los Angeles County Hospital, Calif., under the command of Lieut. Col. Oral B. Bolibaugh, M. C., will train at Camp San Luis Obispo, Calif.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY

NINTH CORPS AREA

The following additional medical reserve corps officers have been ordered to extended active duty by the Commanding General, Ninth Corps Area, which comprises the states of Washington, Montana, Oregon, Nevada, Utah, California and Idaho:

ABBETT, Arthur L., 1st Lieut., Oakland, Calif., Fort Winfield Scott, Calif.

ADAMS, Burton E. E., 1st Lieut., San Diego, Calif., 1st Medical Regiment, Fort Ord, Calif.

BAILEY, Nicholas E., 1st Lieut., Manhattan Beach, Calif., Camp Callan, Calif.

BAIRD, Charles G., Colonel, Santa Maria, Calif., Camp Cooke, Calif.

BANKS, Harry B., 1st Lieut., San Francisco, Fort Winfield Scott, Calif.

BESECKER, Lester D., Captain, Porthill, Idaho, Fort Lewis, Wash.

BRIGGS, John D., 1st Lieut., Weaverville, Calif., 2d Battalion 58th Quartermaster Regiment, Stockton, Calif.

BURSTON, Herschel H., 1st Lieut., Los Angeles, 7th Division, Fort Ord, Calif.

CLARY, Raimond F., 1st Lieut., Santa Rosa, Calif., Fort McDowell, Calif.

COHN, Herbert J., Lieut. Colonel, San Francisco, Camp San Luis Obispo, Calif.

EVERINGHAM, Sumner, Lieut. Colonel, Oakland, Calif., Fort Ord, Calif.

FREDERICKSON, Clyde H., Lieut. Colonel, Missoula, Mont., Fort Lewis, Wash.

FRIEDMAN, Meyer, 1st Lieut., San Francisco, Fort Winfield Scott, Calif.

GATES, Francis K., Captain, El Monte, Calif., Camp Roberts, Calif.

GREENMAN, Robert A., 1st Lieut., Westwood, Calif., Camp Lockett, Calif.

ISHIKAWA, Tokio, 1st Lieut., San Jose, Calif., Camp Grant, Ill.

JORDAN, Philip J., 1st Lieut., San Jose, Calif., Camp San Luis Obispo, Calif.

KAHN, Harold, 1st Lieut., Redding, Calif., Fort MacArthur, Calif.

LEVITIN, Joseph, Major, San Francisco, Recruiting Office, San Francisco.

McCUSKEY, Charles F., Major, Glendale, Calif., Camp Haan, Calif.

MISSALL, Albert S., 1st Lieut., Santa Maria, Calif., Camp Cooke, Calif.

MORGAN, John D., Lieut. Colonel, Fresno, Calif., Fort Ord, Calif.

MURPHY, Paul L., 1st Lieut., Hanford, Calif., Camp Roberts, Calif.

NORQUIST, Donald M., 1st Lieut., Los Angeles, Fort Lewis, Wash.

OLSON, Frederick A., 1st Lieut., Fortuna, Calif., Fort Ord, Calif.

PEARSON, John A., 1st Lieut., Livingston, Mont., 53d Infantry, Sacramento, Calif.

PRITCHARD, Jacob L., Lieut. Colonel, San Jose, Calif., Fort Winfield Scott, Calif.

SPALDING, William C., Major, Los Angeles, Fort Rosecrans, Calif.

WEISS, Isidore I., 1st Lieut., Stockton State Hospital, Calif., Camp Roberts, Calif.

Relieved from Active Duty

PAUL, Norman W., 1st Lieut., North West Air District, Fort George Wright, Wash.

WILCOX, Charles F., Major.

ORGANIZATION SECTION

OFFICIAL NOTES

ANNUAL CONGRESS ON INDUSTRIAL HEALTH

Fourth Annual Meeting, held in Chicago, Jan. 12-14, 1942

DR. STANLEY J. SEEGER, Milwaukee, in the Chair

JANUARY 12—MORNING

Report of the Council on Industrial Health

DR. STANLEY J. SEEGER, Milwaukee: The industrial worker has been given a place of special prominence in the prosecution of war efforts. Loss of working time by skilled and indispensable workers, no matter what the cause, must be classed today as casualties. The necessity for the coordination of effort of various agencies interested in the health and medical care of the defense worker has been generally admitted and real progress has been made.

A meeting of the Subcommittee on Industrial Health and Medicine of the Federal Security Agency and the Council on Industrial Health of the American Medical Association was held late in January 1941. At this time a committee of the Council was appointed to act with the subcommittee to formulate a statement covering industrial hygiene needs of the national defense. These recommendations were endorsed by the Health and Medical Committee, and proposals with reference to the expansion of the Division of Industrial Hygiene of the Public Health Service were promptly put into effect. Funds for special researches were made available to the Health and Medical Committee, and specific projects have been prepared and investigative work has been prosecuted. It is important to emphasize the fact that the proposed program specifically recommends that the Division of Industrial Hygiene of the National Institute of Health should develop, in cooperation with the state authorities and the committees on industrial health of the state medical societies, a definite program of instruction designed to acquaint the practicing medical profession with the fundamentals of industrial medicine and designed to carry into effect the minimum standards set up to protect the health of employees. The subcommittee has pursued its duties in three main channels: (1) industrial hygiene, (2) the physician in industry and (3) the general physician who serves occasionally in industry. Since the first congress in 1939 the Council has stressed the importance of the care of workers in small industries, in which it is estimated that 85 per cent of industrial workers are employed. It is the general belief that the hazards of industrial poisons are present chiefly in the large companies and seldom in the small ones. There is, however, good reason to believe that the individual worker in the small plant is exposed to more hazards or to the same hazards in more ways than the man in the large plant.

The difficulties of attempting to establish industrial health programs in small plants are characteristic of the manner in which science has outstripped the advancement of social and professional organization which would make possible the fullest utilization of our knowledge.

The Council has developed during the past year committees in the various scientific sections of the American Medical Association whose specific purpose it is to work with the Council in this field. The scientific sections of the Association are great reservoirs of authoritive information and will serve as sources of sound advice in special problems. The presentations at this meeting from the Section on Ophthalmology and the Section on Dermatology and Syphililogy, as well as the joint report of the Council on Foods and Nutrition and the Council on Industrial Health on the problems of vitamin administration in industry, illustrate the possibilities of coordination of effort in an association as vast as this.

In cooperation with the Subcommittee on Industrial Health and Medicine, the secretary of the Council has carried out a program listing the qualifications and availability for service of physicians in industry. In reviewing the field of industrial health one is impressed by its importance and by the desirability of stimulating well trained men in adopting this field as a career. With the exception of relatively few well organized medical departments, at the present time industry does not offer to the medical man the opportunities which are afforded to men in other professions. It is hoped that industry, both large and small, can be made to see the advantage of developing medical programs which will provide careers of professional attainment with definite objectives and satisfactory compensation so that industrial workers may be provided with a uniformly high quality of medical service.

Medical Aspects of Vocational and Industrial Training

DR. W. A. SAWYER, Rochester, N. Y.: The national defense program has demonstrated the need for serious consideration of the physical condition of our man power. In realization of this fact, a health project was set up in Rochester, N. Y., for the trainees attending vocational classes for war industries conducted by the Rochester Board of Education. The Rochester Health Bureau, the Monroe County Medical Society and the local Tuberculosis and Health Association have worked closely with the Education Vocational Training Service of the Board of Education. The federal government has provided funds for medical examinations under the provisions of the Emergency Defense Training Act and out of funds assigned to vocational education for national defense. The project includes medical examinations and follow-up of the physically disqualified in an effort to correct defects. The physical qualifications necessary to be an industrial worker are less exacting than those demanded for military service. Industry can use many men who are physically limited. The trainee therefore receives a complete physical examination of the type given at industrial plants. His physical condition and defects are noted on a special record card, with a separate blank for past medical history. In addition to the general check-up, the examination includes a urine examination, a tuberculin skin test and a Wassermann test. All persons who react positively to the tuberculin skin test are urged to have a roentgenogram of the chest at the county sanatorium. All but 10 per cent have done so.

Following the medical examination, a preliminary rating is made in accordance with the following standards:

I. In good physical condition—fit for any job.
II. Having minor physical defects—fit for most jobs.
III. Having major physical defects or conditions needing correction.
IV. Having a disqualifying defect or physical condition which would be hazardous to the man or make it impossible for him to succeed at the job.

At the time of the examination, the physician discusses the findings with the trainee and urges him to seek medical counsel, if needed. When completed by the addition of the laboratory findings, the medical record is referred to a rating committee. As this record is regarded as confidential, the board of education and the state employment service, now the Federal Employment Service, are advised only of the health rating. Men with a III or IV rating receive the following communication from the Board of Education:

A review of your medical examination record shows that you have certain physical defects or conditions needing correction. A report of your health rating has been made to the New York State (now Federal)

Employment Service, which will find it difficult to assist you in obtaining employment until you meet minimum industrial health standards. You are urged to consult your own physician and dentist. If you are financially unable to obtain private medical care and wish to secure the advice of the medical consultant of the Tuberculosis and Health Association, we suggest that you call at the association.

At the same time that he is notified of his rating, the trainee is urged to visit the Tuberculosis and Health Association office. If he does so, the refer clerk takes him, with his record, to the office of the medical consultant located in the same building. There the record is reviewed and the noted defects are rechecked with the objective of qualifying the trainee as soon as possible for employment "specifically cited." Arrangements for necessary treatment are made through existing community facilities, as under no circumstances does the medical consultant give treatment or the nurses make home visits for treatment purposes. Clinics and hospitals, as well as private physicians, are most cooperative in this respect. If, however, it is impossible to obtain corrective treatment, the medical consultant suggests the type of work the trainee is capable of doing. Fitting the man for the job he is physically qualified to fill is the most significant feature of the project. An effort is made to bring a health education message through sound motion pictures to every trainee before he is examined. In addition, literature on the subjects of healthful living, care of the eyes, nutrition, tuberculosis, syphilis and gonorrhea is distributed, and a large part of the nurses' time is spent explaining good health practices. A review of 2,791 records showed that about 33 per cent were disqualified for defense industry employment unless defects were corrected. Of those disqualified, 60 per cent voluntarily sought the Medical Consultant Service of the Tuberculosis and Health Association. Of the 547 men in classes III and IV who saw the consultant, 85 per cent had conditions sufficiently corrected to be given jobs. Of the 110 men found to have definite near vision defects, 84 per cent secured glasses to correct the vision defects and were approved for employment. It was found impossible to make any more than emergency provision for dental repair. All the men found to have cardiovascular disease, diabetes, kidney disease and other chronic diseases were referred to clinics or private physicians, who were requested to give reports of present status to the employment agency. Thirty-three men were referred for surgical treatment of hernia. All having varicose veins were approved for employment after reexamination. The 32 trainees having positive Wassermann tests satisfied health bureau authorities that they would continue under treatment and were subsequently approved for employment with one exception. Arrangements were made to give smallpox vaccinations to men with no vaccination scar. Nine hundred and twenty-eight (33 per cent) were found to have positive tuberculin skin tests and were referred for chest x-ray examination. Seventeen cases of tuberculosis were discovered, 6 of which were active. Of the 514 men seen by the medical consultant, 438 were found to be employable, some in selected jobs. In the rehabilitation program, effort was concentrated on the correction of major defects or conditions.

Sixty-four physicians participated in the physical examinations, assisted by two nurses (full time) and eight nurses (part time, during clinic sessions only). Physicians received $2 for each examination, nurses $1 an hour. The total expenditure to date for these services has been $7,897. Preenrolment examinations have not been possible. Examinations during training had certain advantages. The men did not feel they were being rejected before they had been given a chance to demonstrate what they could do. It removed the opprobrium that physical examinations do not give a chance in borderline cases. In some instances, final decision as to a man's workability was a combination of physical examination and trial in certain jobs while training.

This program can be undertaken by any community if the various agencies will cooperate. It is one way of offering preplacement medical examinations to small industries. A majority of applicants for work in the younger age groups can easily be persuaded to take advantage of community facilities for the correction of physical defects.

The Physiology of Work

DR. A. C. IVY, Chicago: This article appears in full in this issue, page 569.

A Symposium on Tuberculosis in Industry Held at the Saranac Laboratory, Saranac Lake, N. Y., in June 1941: A Résumé

DR. LEROY U. GARDNER, Saranac Lake, N. Y.: This program was arranged to clarify concepts of tuberculosis and to define the influence of factors peculiar to industry that may affect this infection. Dr. Dublin and Dr. Gafafer presented data on the incidence and trends of tuberculosis in different industrial groups. In 1911 this disease was the first cause of death among wage earners, accounting for 20 per cent of their mortality; today it is sixth in importance and responsible for 6.5 per cent of their deaths. Its prevalence in any community is determined by the general standard of living and by the number of open carriers. In particular occupations the factors of selective employment and unfavorable environment modify the picture. If such factors are dominant the incidence in the wage earners will be different from that in their families. The effects of an outstanding factor such as silica are manifest in all tables comparing tuberculosis mortality in different occupations. Of twenty British industries with the highest mortality from tuberculosis, thirteen involve exposure to silica dust; of the corresponding twenty in this country, only six fall in the same category. A pertinent fact brought out by Dr. Dublin is the shift of peak mortality to higher age levels during the past fourteen years.

It is accepted that the source of the great bulk of infections is a human carrier with a pulmonary cavity. From the public health standpoint the objective is early detection of these carriers, segregation and closure of their cavities. Discussion disclosed a lack of reliable information on the effectiveness of artificial pneumothorax in rendering the sputum negative for tubercle bacilli. In Trudeau Sanatorium this form of treatment has effected conversion in only about 30 per cent of the cases tried.

While the home is probably the place of most childhood and some adult contacts, many primary and more reinfections must occur in the place of work. Nurses, physicians and attendants on the sick encounter a real occupational hazard from infection itself. It was Dr. Amberson's belief that they should accept this hazard as incidental to their professional life and that hospital management on its part should assume the obligation of minimizing opportunities for mass infection.

The influence of first infections was debated, some holding that they were responsible for both positive tuberculin reactions and relative immunity to reinfection. Dr. Amberson felt that the frequency of significant reinfections is about as great in positive as in negative reactors.

Dr. Johnston referred to a demonstration of the possibility of endogenous reinfection in adolescents. A group of children whose contact with tuberculous parents had produced positive tuberculin reactions but no x-ray evidence of reinfection were removed to foster homes. There, without further known exposure, they later developed clinically significant tuberculosis. The question of the frequency of reinfection at different age periods is extremely important to the public health official. Evidence from many surveys indicated that both old and clinically significant tuberculosis can be found at any age. Most of the material seemed to suggest that the frequency of old tuberculosis increases progressively with age. But even in the sixth and seventh decades there is today plenty of tuberculosis that needs treatment. Opinions differed on the source of such infections. Many felt that most of this old age disease represents carry-overs in resistant hosts of infections acquired when tuberculosis was more prevalent than now. Dr. Sander presented convincing evidence from his experience with eight annual examinations on a group of seven thousand industrial workers.

Mr. Cummings concluded that new infections must be constantly acquired from external sources and based his opinion on the progressive increase in their incidence in successive age periods.

Dr. Fellows agreed that repeated reexamination is essential if tuberculosis is to be controlled. His experience of thirteen years has demonstrated new infections at all ages among the fourteen thousand employees in the home office of the Metro-

politan Life Insurance Company. The number of such cases has steadily declined from 56 in 1928 to 13 in 1940. Sometimes extensive shadows develop within a few weeks after a negative film. It seemed to be the consensus that reinfection is possible at any age, that it is most common before ages 30 to 40 and that, for new disease to develop in the elderly, repeated contact with a carrier is essential. Recognized symptoms may or may not be associated with these x-ray manifestations of new disease.

The factors which determine whether healing will occur were our chief concern. Sex becomes important when one reflects that 65 per cent more young women than men die of tuberculosis between ages 15 and 25. Dr. Johnston's evidence indicated the probability that the unfavorable course of the infection at the onset of menstruation could be correlated with chemical disturbances in body metabolism. From a practical standpoint the employer of large numbers of women needs an effective medical department if he would avoid a tuberculosis problem.

Certain races must have acquired some immunity, transmitted by the generations of ancestors who have survived the ravages of tuberculosis. This factor was so intricately associated with the effects of living standards and environment, particularly after migration into a new country, that its effects could not be weighed.

Nutrition is probably one of the most important factors influencing susceptibility to infection, but also one of the most difficult to evaluate. Body weight is not a significant index. The last war demonstated what could happen to the tuberculosis rate when a prosperous country like Denmark was suddenly deprived of its food supply. The incidence of disease in the age group 20 to 25 increased by 30 per cent. When the embargo was lifted, the tuberculosis rate promptly fell again. Faber attributed this to the low nitrogen intake of these growing adolescents. Dr. Johnston pointed out that the diabetic are particularly susceptible to tuberculosis and that in the frequent phases of acidosis they show negative nitrogen and calcium balances. It was his impression that depletion of the reserves of both these elements precedes as well as accompanies development and spread of tuberculosis. The influence of fatigue was studied in the automobile industry and in a steel mill. In neither case was there evidence to suggest that this factor was responsible for any excess of tuberculosis.

Abnormal degrees of temperature and humidity have likewise been alleged to lower resistance to tuberculous infection. This belief has little to support it.

Trauma does not initiate a primary tuberculous infection of the lungs. The decision of traumatic origin involves not only x-ray findings but the past history and clinical course of the disease before and after injury.

Tuberculosis has been regarded as the great enemy of the printer and in turn was attributed to lead poisoning which printers [might have] contracted. This group and the painters have from 16 to 17 per cent more tuberculosis than all occupied males. Among lead and zinc workers an excess of nearly 8 per cent was reported by Whitney. Dr. Belknap made physical examinations with sedimentation time determinations on 40 printers and found nothing suggestive of tuberculosis. He felt, however, that the storage battery plants would be a better place to evaluate the effects of lead. Here there is plenty of lead dust in the atmosphere, and the incidence of lead absorption is high. He reported his findings on 97 workmen followed from five to eleven years in a battery plant where the labor turnover had not been more than two men a year. Of this group 77 per cent had had lead absorption with occasional attacks of lead poisoning. On x-ray examination only 3 cases of tuberculosis among the 76 were involved, and in 2 of these the infection was apparently old and healed. Dr. Belknap felt that neither lead absorption nor lead intoxication was the cause of the reported excess tuberculosis in this group of trades.

Fumes and gases are inhalalable, and many of them are sufficiently irritating to provoke severe inflammatory reaction. Mature judgment on the effects of gas used by the armies during the last war reversed the early opinion that this agent was responsible for the excess of tuberculosis that developed. The report of the Surgeon General of our army for 1919 gave the tuberculosis rate for gassed soldiers as 2.45 and that for all enlisted personnel as 4.3. In 1930 Price summarized the final experience of all nations participating in that war and reported the unanimous opinion that the increased tuberculosis rates were not the result of exposure to irritant gases. Evans drew similar conclusions from his routine annual examination of a large group of employees of the du Pont Company engaged in the manufacture of chlorine, phosgene, hydrofluoric acid and other irritating gases. In a study of a group of men exposed to sulfur dioxide Kehoe and his associates discovered no excess of tuberculosis, and the same apparently applies to smelters handling sulfide ores. The Metropolitan Life Insurance Company's tables give the standardized relative index of tuberculosis mortality for chemicals and explosives operators as only 85, on a basis of 100 for all occupied males. Experimental evidence is likewise generally negative.

The general thesis that inflammation of the lungs is necessarily unfavorable to the course of associated tuberculosis has little support. Dr. Siegal reported that in roentgenographing 5,000 patients in general hospitals he had found no excess of tuberculosis in those admitted for acute respiratory infections. On the relatively rare occasions when tuberculous patients develop lobar pneumonia the chronic infection is found unaltered when the acute one has resolved. In the Saranac Laboratory literally hundreds of guinea pigs have been infected by the inhalation of attenuated tubercle bacilli. If chronic epizootic pneumonia happens to be present in one or more lobes of the lungs the tubercle bacilli fail to localize there but develop in the other lobes. If the pneumonia appears after the tubercles have formed, their usual self-limited course is unaffected.

It is probably true that certain kinds of inflammatory reactions may have more influence. The increased incidence of tuberculosis that followed epidemic influenza may have been due in part to pneumonic complications. These inflammatory reactions are peculiar in that they involve blood vessels and destroy the fixed tissues of the lungs. However, the common report that the onset of tuberculosis followed an attack of pneumonia is not infrequently due to faulty diagnosis during the acute phases of the tuberculosis itself.

Dr. Adelaide R. Smith reported on grain handlers exposed to high concentrations of organic dust in unloading lake steamers. She found that 2.5 per cent of a group of 234 showed x-ray evidence of clinically significant tuberculosis and that another 2.3 per cent had old healed lesions. Social economic factors rather than grain dust were thought to be responsible. Another organic dust, tobacco, has been under suspicion as a cause of tuberculosis since Ramazzini's time in 1700. Dr. Charles Francis Long described conditions in a modern cigar factory. Here there was less tuberculosis than in the city where the plant is located. However, this is not surprising in view of a well organized medical service and air conditioned workrooms. Plants like these must be affecting the picture, as the latest Metropolitan mortality figures for 1937-1939 show an index for tuberculosis of 107 in cigar and tobacco factory operatives. In 1922-1924 it was 135. Dr. Long believed that the former high rates for tuberculosis in the industry were due to social-economic factors and the selection of such work by the under par. Seventy-five per cent of the labor, which now produces only 25 per cent of the product, still works in small shops without health supervision.

Dr. Brumfiel reported the very low rates for tuberculosis found in the Saranac Laboratory studies of the cement and gypsum industries. Among 2,278 cement workers in eleven plants scattered widely throughout the country there were only 4 cases of clinically significant tuberculosis, a rate of 0.18 per cent. Among 175 gypsum workers there was only 1 such case, yielding a rate of 0.57 per cent. In both groups the usual amount of healed infection was disclosed, so that opportunities for infections had not been lacking. Dr. Benson reported that Vermont marble workers had two and one half times as much tuberculosis as the general population of the state, exclusive of the granite center in Barre. It should be recalled that Vermont's population is largely rural. By contrast, the rate for granite workers was one hundred and thirty times the general one. All

these observations support the view that exposure to organic and nonsiliceous dusts has little influence on susceptibility to tuberculosis.

A day was devoted to a consideration of the effects of dusts high in free silica. Reports on foundries, quartz mining and the granite industry brought out that higher tuberculosis rates prevail in these trades, that there is a greater tendency for such infection to develop after age 40 rather than earlier and that the infection is extremely chronic, often giving no symptoms of intoxication or a positive sputum until shortly before death. Mr. Cummings pointed out that in miners the incidence becomes higher and the prognosis of associated tuberculosis worse as the severity of the silicotic reaction increases. Miners exposed to silica dust with no roentgenographic evidence of reaction showed little more tuberculosis than the community in which they lived. Dr. Greenburg, Dr. Pope and Dr. Sander pointed out that among silica industries the foundries caused the least amount of tuberculosis, and Dr. Benson's report on the granite industry showed that it probably caused the most.

Dr. Siegal told of survey methods and where it might be profitable to look for tuberculosis. The most productive source was among household and other contacts and in groups between the ages of 15 and 30 who were readily accessible. Negroes and those in the lower income brackets were particularly fruitful sources.

Dr. Bristol pointed out the educational value of demonstrations like those in the Bellevue-Yorkville District and in Cattaraugus County, N. Y. Defense industries are bringing thousands into cities not prepared to house them, families have been disrupted and many are being subjected to unusual strains. The food supply is adequate, but overcrowding and attendant social-economic factors will take their toll if we are not on our guard. Already there are indications that the death rate has ceased to decline.

Dr. Sawyer presented details on the program of control that has operated so successfully under his direction for the past nineteen years in the Eastman Kodak plant. It costs $10,500 annually, but it also costs $3,218 to treat 1 minimal case of tuberculosis. The attack rate in this plant has fallen from 2.3 at the outset of his study to 0.2 at the present time.

The interest of the compensation insurance carrier in tuberculosis has become progressively real. Mr. Henry Sayer reviewed the successive modifications of legal opinion that are leading to the general acceptance of tuberculosis as an occupational disease. He asked whether it might not be wise to admit that some of it is occupational in origin but to define by scheduled law the conditions under which it should be compensable. Questions of fact he would leave to a medical board. His proposals brought objections on two grounds: (1) that management would seek to protect itself by excluding even healed tuberculosis in the preemployment examination, thereby creating a group of unemployables, and (2) that such a plan would in reality become health insurance by opening the door to include heart disease and all other chronic conditions.

Mr. Cummings proposed an alternative plan. He suggested that evidence of tuberculosis in any form should preclude employment in industries with silica or other proved hazards and that compensation should be allowed for all tuberculosis subsequently developing in such employment. In other industries, with no specific hazards, he would permit persons with healed tuberculosis to work but would allow no compensation for infections that might become active or develop during employment. In view of the evidence that old tuberculosis so rarely breaks down in any industry except industries with silica hazards, this would appear most equitable.

A labor point of view on tuberculosis was presented by Mr. Woll, who protested against abuse of medical examinations.

The symposium closed with a summary which pointed out that, aside from nutrition and social-economic factors, silica was the only other one which had a recognized effect on susceptibility to tuberculosis. Many industrial conditions popularly accepted as predisposing to this disease were without measurable effect.

Procurement and Assignment of Physicians for Industry

Major Sam F. Seeley, Washington, D. C.: All physicians, dentists and veterinarians, for purposes of procurement and assignment, fall into three age groups: 45 and under, 45 to 60 and 60 and over. Congress has said that every man physically fit under the age of 45 shall be made available for military service. Essential personnel on medical school staffs, on hospital staffs, in industry and in nonmilitary organizations should wherever possible be over the age of 45. This refers to nonmilitary governmental services as well. Dependence may also be placed on those men who cannot pass physical examinations for commission in military service, on women physicians and on men who are not doctors of medicine but whose training allows them to substitute for male physicians under 45. The Procurement and Assignment Service is charged by the President to reserve from military service men who are essential, but the burden of proof as to the essential nature of each individual rests on the employer, according to act of Congress. Surveys already made and to be conducted by county, state and corps area advisory committees will assist in classifying physicians. Each corps area committee will consist of a chairman, a medical educator, a hospital representative, two general practitioners, two dentists and one veterinarian. These boards will act as referees to determine the availability of physicians for various kinds of service and will be expected to take the brunt of any criticism as to the availability or nonavailability of all physicians. A master questionnaire is now being drawn up on which these appraisals may be based. The Industrial Health and Medical Committee, acting in an advisory capacity to the Procurement and Assignment Service, is constructing that portion of the questionnaire which will assist industrial organizations in determining which men are essential. As shortages are defined, the Procurement and Assignment Service will assist in locating personnel in all specialty classifications.

January 12—Afternoon

Dr. Warren F. Draper, Washington, D. C., in the Chair

A Dental Program for Industry

R. M. Walls, D.D.S., Bethlehem, Pa.: A study recently made to determine how many industries operate dental services revealed that, out of eight hundred and forty-one industries listed by the American College of Surgeons and to which questionnaires were sent, four hundred and ninety-eight, or 59 per cent, replied. Of these one hundred and sixteen, or 23.3 per cent (13.8 per cent of the whole number), reported having a dental service. About one company in ten employing more than five hundred people and having an approved medical service maintains any dental service whatever. Forty-two per cent of the dental services are in plants in the Eastern states, 37 per cent in the Middle West and 21 per cent in the Southern and Western states and in Canada.

Considering the great interest that industry has shown in the health and welfare of its employees, it is rather difficult to understand why the dental health of these people has not been included. It is possible that the expense entailed may curb at least the small companies from establishing a dental service. In a study of dental clinics of fifty-nine companies made by the Division of Hygiene of the Pennsylvania Department of Labor and Industry, it was found that the average cost of equipping a dental clinic was $1,958.03. This figure would probably reach $2,500 today. If a medical service is already in existence, a great saving could be made by the use of the existent x-ray facilities, so that initial expense should not rise above $2,000. Figures obtained from the study gave yearly expenditures by the company toward dental service of from 64 cents to $9.45 per patient treated. These figures vary so widely that attempts to analyze them would be futile. A hypothetic dental budget drawn up by the Metropolitan Life Insurance Company for a company employing one thousand persons and wishing to establish a dental office on its premises for examination and prophylactic work, emergency, consultation

and first aid service, extractions and cement fillings gave a figure of approximately $2,000 for initial installation and $5,400 for yearly running expenses.

Dental service in the industries when practiced was most frequently paid for by the employer as his contribution toward the good will and efficiency of his working force. Next in frequency is a cooperative arrangement wherein the company furnishes space for a dental office and perhaps also a certain amount of major equipment. A local dentist comes in, usually on a part time basis, bringing with him his own instruments and supplies and usually charging fees by the operation. These fees are usually lower than in an outside practice because the dentist's overhead is cared for, his practice is steadier, his bills are easier to collect and he can make a reasonable income at a reduced price.

Another procedure, found chiefly among large corporations with well developed employee welfare policies, involves the use of a mutual benefit association. These associations are organized among the employees for the purpose of group purchase of medical and dental care and often for a variety of other purposes as well, and in the better examples the company management makes a contribution to the association either in the form of a sum equivalent to a percentage of the dues collected from members or in the form of space and equipment for the conduct of the benefit association's activities, or both.

Part time dentists are employed almost four times as frequently as are full time dentists. Private practice keeps the dentist in competition and awake to new developments. It is possible for the management to evaluate his skill in terms of his success in private practice. Dentists are to be found in control of the professional standards of by far the majority of the dental services, while executive responsibility rests more frequently in the hands of a physician, personnel director or one or the other of them in combination with the dentist. Only a few corporations reported that they had encountered any opposition on the part of local dental societies. An equally small number reported that they had consulted the local society at the time their service was set up. A large majority of companies allow time for the performance of the dental operations specified in their services, without any deduction for the time lost by the employee.

An ideal dental service in industry is one established under the direction of the medical service headed by a qualified dentist. There should be a system of complete and accurate records of the oral conditions of all employees. A mouth examination should be made of every applicant for a position or on the presentation of a certificate from his dentist. No employee should be admitted whose mouth shows gross lesions of any communicable disease or evidences of infection. A mouth examination should be made every six months, bite wing diagnostic films being made, and defects charted. A prophylaxis should be given by the dentist or by a hygienist and the employee referred to a private dentist for any reparative work that is indicated.

Only about one third of a given working force appear to be sufficiently interested in health to respond to the company's invitation to receive this dental service. Employees who are engaged in occupations requiring the use of lead or mercury, acids, radioactive materials or carbohydrates should have more frequent examinations. Employees receiving injuries to the teeth or supporting tissues should be referred immediately to the plant dentist; also those who have developed oral manifestations of occupational diseases.

Certainly there are many industries that will find it unnecessary to employ a full time dentist, and it may be advisable to employ a hygienist who will relieve the dentist of the prophylaxis service. The company should not attempt to supply operative and other types of dental treatment which are available from the licensed dental practitioners of the community at fees which the employees can meet nor should it interfere with the freedom of choice of practitioner on the part of its employees who are able to receive private treatment.

Industrial Dermatoses

This report, by the Committee on Industrial Dermatoses, Section on Dermatology and Syphilology, American Medical Association, Dr. C. Guy Lane, chairman, appears in full in this issue, page 613.

The Workmen's Compensation Medical Panel System of New York State

DR. DAVID J. KALISKI, New York: Prior to 1935 an injured workman who was entitled to compensation and medical care under the workmen's compensation law could not select his own physician. The law was amended in 1935, giving the injured employee the right to select his own physicion provided only the physician had complied with the law by obtaining the necessary authorization to treat compensation claimants. The industrial commissioner was authorized to establish a schedule of fees for medical services, prepared on the basis of fees submitted by the president of the Medical Society of the State of New York.

The law provided that the employer shall have the right, subject to regulations prescribed by the commissioner, to recommend to the injured employee the names of enrolled physicians whom he believes competent to treat him. Insurance carriers were also given the right to maintain rehabilitation bureaus operated by qualified physicians if approved by the medical society and authorized by the commissioner. An employer was given the right to maintain a compensation medical bureau at the place of employment, if such medical bureau was required because of the nature of the industrial hazards or the frequency of injuries to employees arising out of industry. The claims of authorized physicians for medical services are no longer subject to approval or certification by the industrial board.

Public hospitals maintained by taxation are permitted to treat only emergency cases. The law provides for the establishment of laboratories or bureaus engaging in x-ray diagnosis, roentgen treatment or physical therapy but all such laboratories or bureaus must be operated or supervised by qualified physicians duly authorized under the law and subject to the approval of the medical society board of the county in which they are located.

The Industrial Council of the Department of Labor was enlarged from ten to fifteen members; five of the members represent the interests of employers, and five are physicians licensed to practice and known to represent the schools of medical practice eligible to practice under the workmen's compensation law. These appointments are made by the governor. The council is advisory to the industrial commissioner and may on its own initiative recommend to the commissioner such changes of administration as it may deem important and necessary.

Emergency first aid treatment may be rendered by any licensed physician, but continued treatment may not be rendered by such physician unless he is duly authorized. A licensed physician who is a member of a duly constituted medical staff of any hospital may render medical care while an injured employee remains a patient in the hospital. Under the personal supervision of an authorized physician, medical care may be rendered by a registered nurse or a registered physical therapist.

The statute specifically imposed on the compensation committee or board the duty not only of qualifying the physician but of including in this qualification the character of the medical care which the applicant is qualified and authorized to render. Similar provisions are made for the application of pathologic and x-ray laboratories. It is definitely provided that physicians in charge of pathologic and x-ray laboratories must be qualified and authorized. Since the inception of the law there has been a gradual evolution in the method of qualifying physicians, and the standards of qualification for specialists have also gradually increased. The law imposed on the sixty-one county medical societies of the state a huge task and responsibility, for during the first few months the workmen's compensation boards had to be appointed, and in the larger county medical societies special quarters and clerical staffs had to be set up.

The New York State society committee has set up examining committees in radiology and radiation therapy which meet periodically and examine candidates for x-ray rating if the local county society committees are unable to evaluate their qualifications on the basis of the credentials submitted in the application.

Osteopaths may now submit evidence of qualification in minor surgery and obtain a license to perform minor surgical procedures.

By March 1, 1941 about nineteen thousand physicians and specialists were qualified in this state, the vast majority of them by the county society committees. There are at present sixty-one county society compensation committees.

The work of these committees is coordinated by the Bureau of Workmen's Compensation set up by the state medical society, and the director of this bureau is a member of the state council committee of workmen's compensation, consisting of three members.

The arbitration proceedings are set up in accordance with the arbitration laws of the state of New York, and all awards are final and binding on both parties.

The chief recommendation made by the commissioner and enacted into the amended law was the free choice of physicians with adequate control over such physicians by a body best suited and able to control them, namely the organized medical profession.

Mass Roentgenography of the Chest for the United States Army

MAJOR ALFRED A. DE LORIMIER, Washington, D. C.: This article will be published in full in *War Medicine*.

JANUARY 12—AFTERNOON

DR. LEVERETT D. BRISTOL, New York, in the Chair

SYMPOSIUM ON UNDERGRADUATE INDUSTRIAL MEDICAL EDUCATION

Present Problems in Curriculum Adjustment

DR. RAYMOND B. ALLEN, Chicago: Universities are continually pressed with the problem of adjusting the requirements of specialties to a unified curriculum in the medical schools. The faculty of medicine has the responsibility of presenting laboratory and clinical experience to the student body in such a way as to guarantee that each student secures sound training in the fundamentals of medicine. No pretense is made these days to present all the information which exists in the body of medical science, but the fundamentals can be and are taught very effectively. In addition, we must emphasize during the present emergency the military and industrial aspects of medical science in order that the products of medical education may be able to fit smoothly into the needs of the social, industrial and military establishments.

Industrial health problems have assumed major proportions, owing to the rapidly increasing industrial population and by the impact of war production. In fact, industrial health is now recognized as a special field in public health administration. Preventive medicine and industrial health have also become, almost over night, vital factors in the national victory program. The medical profession and medical educators will accept this challenge and make a worthy contribution.

Medical schools can contribute in several ways. All fundamental and clinical departments must emphasize instruction bearing on industrial and military medicine. Such instruction must be coordinated by periodic interdepartmental staff conferences. If not already created, a survey course should be established for upper classmen in the general field of industrial hygiene and occupational disease, including laboratory work, clinical demonstrations and field trips. Teaching should include workmen's compensation, safety engineering and commercial and business administrative problems bearing on the welfare of workers. Also elective courses should be provided for students desiring advanced work. The theory and practice of first aid needs greater emphasis. Internships should be adjusted to reflect in greater degree the problems of industrial health through special study of occupational disease. A short service in the medical department of some factory is desirable. Long-term graduate courses in public health administration leading to proficiency in industrial health and control of occupational disease are greatly needed, as are also short courses for practicing physicians engaged in some form of industrial medical service. These courses should be of two kinds, refresher and advanced specialized study. The medical schools are endeavoring to play their part in developing programs that will better serve industrial medicine, industrial health and the welfare of workers on the civilian defense front.

Industrial Health—A Separate Discipline

DR. T. LYLE HAZLETT, Pittsburgh: No one will dispute the importance of industry in the United States at the present moment. Thirty-four million people are now employed by industry, and all are doing an essential job. Modern warfare requires the mental and manual work of twelve million persons to maintain one million under arms. With a high percentage of the thirty-four million industrial workers forming the backbone of our national defense, time lost because of accidents, health hazards and improper placement of the workers can be regarded as an actual wartime casualty. These thirty-four million people are spending at least 24 per cent of their present existence at work. What accepted specialty in our profession offers such an opportunity for health influence and guidance? If viewed in this light, certainly industrial medicine with its infinity of ramifications deserves a place of its own as a recognized and distinct specialty in the field of medicine.

The history of industrial medicine can be traced from simple first aid administration to its present place as a consulting service in the placement of workers, environmental control and health maintenance of employees as well as the immediate care of sickness and injury of the industrial worker while at his occupation. This story reveals the rather insignificant role of the physician in this evolution. Compensation laws, employee interests and economic trends have demanded increased efforts from physicians, thus presenting greater opportunities for preventive as well as curative medicine. Why do physicians oftentimes find themselves in subordinate positions, since no other group with their training and experience is so well fitted for guiding such programs in our industrial organizations?

What is to be done to rectify this condition? Only by providing sufficiently well trained men in this field can industrial medicine be properly emphasized and the importance of its place in medicine and industry clearly outlined. With the present interest evidenced by government, labor and industry in the conservation of manpower, no salesmanship should be necessary to place such a group of trained men. This group should use its influence to effect a change in the modern medical curriculum to include sufficient teaching of industrial medicine and to present its scope and its future. This would allow the student to evaluate this branch of medicine as a future field for specialization just as he does obstetrics, surgery and other specialties.

The field of industrial medicine is too far reaching to be covered in undergraduate years, but a certain number of hours could be devoted to preparing the student for a graduate course similar to the training required for admission to the various specialty boards now in existence. Such a course would fit a physician to be called a specialist. If such a curriculum should be adopted and industry could secure pretrained men, thoroughly acquainted with the problems to be met and handled, I feel sure they would be properly remunerated and be able to render a valuable service.

In planning for instruction in the undergraduate curriculum we should have in mind the following ideas:

1. Industrial medicine should be offered to undergraduates as a separate course. Disconnected bits of information in the various courses throughout the four year curriculum do not constitute sufficient instruction in this field, and the importance of the subject is lost.

2. The lecture hours should be devoted to industrial topics. The scope of industrial medicine, its history and importance should be presented. Following this instruction, there should be such broad groupings as (*a*) orientation and general considerations, (*b*) placement of the worker from a physical and mental standpoint, (*c*) routine role of the physician in the plant, (*d*) hazardous occupations (determinations, preventive health measures), (*e*) general health education and (*f*) research (a field unlimited and constantly widening). Such a program is entirely feasible even if only twenty hours is given in any one academic year—preferably in the senior year. True, only the surface of the subject would be scratched, but a stimulus for future study in graduate work would be implanted and the entire class would get sufficient insight into the subject to respect its importance.

The faculty for both undergraduate and graduate instruction in this special field of medicine may very readily be gathered in most communities in which medical schools are located. Self-trained industrial physicians are available for such teaching. Chemical and engineering instruction is likewise readily available.

This presentation has been given as a challenge to those who carry the responsibility for industrial health to help in every way possible. Let us be able to offer to industry physicians with sufficient knowledge so that they may assume their proper responsibility and status. The work of these trained men will be a bulwark against certain socialistic trends which are constantly appearing on the horizon. And at no time in the history of our country has so much depended on the conservation of man power among our industrial workers as at the present time.

Correlation of Industrial Hygiene Instruction with Other Clinical Training

MR. DONALD E. CUMMINGS, Denver: Medical schools and schools of public health should assume responsibility for supplying competent industrial physicians by including suitable industrial hygiene training in their courses of instruction. The problem of incorporating this subject in an already crowded curriculum is only part of a greater challenge to offer adequate teaching in preventive medicine as a whole. Many medical schools should accord industrial hygiene instruction greater distinction, recognizing the subject either as a separate discipline or as an important division of departments such as medicine or preventive medicine and public health.

The primary requirement for satisfactory industrial hygiene training will be discharged only when industry is represented in the classrooms and clinics of the teaching hospital by an instructor possessing an intimate understanding of, and sincere devotion to, the peculiar health problems of the worker. Experience in industry is the key necessary to unlock the door to the treasury of information which imparts reality and interest to the student. This knowledge not only should be available but should be utilized in the outpatient department, in the hospital wards, at meetings of the staff and in teaching clinics. The attention of these groups should be focused repeatedly on the mortality and morbidity experience of various occupational divisions of the population as well as on the industrial conditions producing unfavorable records and on the practical measures which may be adopted for their control. Contributions of this nature prepare medical students for more constructive service than merely ministering to the hurts and ills of industrial workers.

At the outset of clinical instruction the industrial hygiene department should demonstrate in clinics the proper manner of eliciting and recording an occupational history. The importance of this record should keep the entire medical staff alert in recognizing the occupational problems. A simple tabulation of the principal occupations classified according to the hazards or diseases common to each will serve as a useful guide to both students and interns.

Occupation also should be assigned an important place in the statistical classification of all medical records in the hospital and outpatient department. An analysis of the common diseases diagnosed or treated in the institution, by occupation, serves a more useful purpose than a tabulation of the specific occupational disease cases observed during the same period and should be discussed with the staff and students at regular intervals.

Another meritorious arrangement consists in having an industrial hygienist participate regularly in ward walks, appropriate medical clinics, roentgenologic and clinical-pathologic conferences so that both staff and students study a patient in relation to his working environment with as much interest as is attached to the manifestations of disease. In many hospitals where teaching otherwise is excellent the significance of industrial influence on such common diseases as pneumonia, tuberculosis and degenerative disorders frequently is overlooked completely.

Training also is facilitated by suitable laboratory demonstrations and by the use of appropriate museum material or exhibits. The industrial hygiene department should be willing to assist other departments offering laboratory instruction in technics and tests applicable to industry, or it should maintain a separate laboratory for this purpose, so that students will become familiar with the special procedures utilized in industrial toxicology and hygiene.

The most essential requirement for this type of training is an industrial medical clinic. In this clinic the health of hospital and medical school workers and applicants for employment is appraised and supervised. Around this point are focused the medical procedures developed to discover, treat or control occupational disease in individuals entering the hospital or outpatient department or among hospital employees; here are centered the standardization and supervision of public health practices applicable to the operation of the plant, and here are maintained records and methods which illustrate proper administration of an industrial hygiene department. Medical students and interns serving in this type of clinic under the direction of competent industrial hygienists derive experience which makes the application of preventive medicine both attractive and inspiring.

Many talents must be united to achieve healthful working conditions, and it is doubtful whether any other branch of medicine requires such a high degree of cooperation with other services to obtain successful results.

The Industrial Clinical Clerkship

DR. FRED J. WAMPLER, Richmond, Va.: Industrial health as conducted by the more advanced industries is preventive medicine in the fuller sense of the term. If a medical student can get a truer picture of what the public health movement is by working in a health department, then a medical student should get a better idea of what advanced industrial medicine is by working in a progressive industrial medical setup.

Out of the fifty-one medical schools in the United States and Canada reporting organized teaching in industrial health, only one reported an elective in which the student went into the plant and worked with the physicians and staff of the pathologic and toxicologic research laboratories of the industry.

In the Medical College of Virginia the clinical clerkship in industrial health consists of two weeks spent in a chemical plant employing between three thousand five hundred and four thousand workers, in which there are five full time physicians and eight nurses in the medical department. Another two weeks is spent in another plant of the same company with entirely different chemical hazards and problems. The second plant has seven full time physicians and twelve nurses for seven thousand employees. Two days out of this second two weeks are spent visiting the headquarters organization of this industry. Another day is spent in the toxicologic research laboratory. The students work with the doctors, watch preemployment examinations, see the patients who come in for inspection or advice and read roentgenograms that are taken of the employees as if working in a clinic in an outpatient department. Required readings on industrial health, occupational diseases, compensation laws and plans for giving better

health services to small plants are assigned. These are discussed with the student during his course or at its completion. Five students out of a possible eight appointments took the elective the first year, six the second year, and two the third.

Difficulties in establishing industrial health clerkships are numerous. Only a small percentage of plant managers will agree to start the program. Progressive plant physicians willing to assign time necessary to teach the students must be found. Some students, for emotional and personality reasons, would not be acceptable. Before this plan can be adopted, the course in medical schools must be arranged so that the senior student can spend the necessary time in nonresident work. The attitude of organized labor toward medical and health services by the employer has generally been unfriendly and in some cases openly hostile. The cost to the medical student is a problem. Some way will need to be worked out so that the extra cost of going to plants or even living away from school can be met. A temporary difficulty now is the great difficulty of getting any outsider in plants holding defense contracts.

In spite of present difficulties, the industrial clinical clerkship for senior medical students should be adopted as fast as is consistent with healthy growth by the medical schools of North America. Where this cannot be done, field trips of at least one-half day's duration should be taken to progressive medical departments in industry where the medical director can show what the industrial physician is doing and can do for the employee and how he and the family physician can mutually assist each other in keeping the industrial population well.

Industrial Experience in the Internship

DR. WILL F. LYON, Chicago: One of the larger teaching hospitals in Chicago realized that too few accident cases were admitted for the proper training of their interns. The idea of obtaining clinical experience in these and other directions in industrial plants was suggested by the preceptorship plan of the University of Wisconsin. Experience of this kind should enable a physician to regard occupational disease hazards intelligently, to assist in the examination of employees and to organize an effective industrial medical program. The interns, therefore, were assigned to a plant. The management willingly offered to put them on the payroll, but it was decided that it was inadvisable to compensate them. Each of the interns kept a notebook during his six weeks' service in the shop, which was checked after each division of experience by the physician in charge. They were accompanied and supervised in all activities by the safety or chemical engineer, who explained manufacturing processes, and by the physicians. Each visited the entire plant slowly enough so that he had a chance to observe at first hand all industrial health problems. He was present during preemployment examinations and was taught as well as could be the evaluation of some of the factors attending employment or rejection. The intern was also instructed in the estimation of disability through direct examination and proper recording of such findings as muscular power, nerve function and other appropriate factors. Under this system of instruction it was possible for the intern accurately to estimate the disability. The management of accidents included everything from scratches and superficial foreign bodies in the eye to serious burns. The intern was kept informed of progress after hospitalization.

An intern service of this kind in the larger industrial plants where competent physicians are in attendance would shortly result in the development of many more physicians familiar with industrial problems. It is extremely important that as many doctors as possible in every community be so informed because of the possibilities of sabotage and bombings. If this program could be carried on there would be less disquieting friction between physicians in general practice and industrial physicians. Interns, of course, should not replace medical, nursing or first aid personnel. There should be no suspicion of exploitation of interns for the benefit of industry. The whole training period must be designed to provide maximum educational benefits.

The Occupational Disease Clinic

DR. MILTON H. KRONENBERG, Chicago: The purpose of an occupational disease clinic should be (1) to study scientifically disease and disability resulting from environment in industry and to spread this knowledge, (2) to promote clinical research in the health problems associated with expanding industrial technology, (3) to study clinical material disinterestedly and not to establish liability and (4) to service as a fact finding body.

Factors that enter into the successful organization and operation of such a clinic are the opportunities for successful clinical teaching of the occupational diseases in other clinics, the complex nature of the material, correlation between dispensary units in case records and other data applicable to industrial exposures, suitable time for a scheduled period and a conviction that occupational diseases are interesting and dramatic.

Patients originate from private physicians seeking diagnostic aid in questionable cases. They may be indigents seeking specialized professional care. The patient may also be referred by a charitable or welfare society or private, official or semiofficial agency. In other cases clinical material is made available by requests for consultations from other clinical units of the dispensary. Then there are instances in which employers themselves deem it advisable to refer questionable cases for medical opinion by this clinic. Industrial workers as well as insurance carriers and attorneys also like to make use of specialized services. However, not all cases are eligible, and the tendency is to limit admittance for such reasons as not meeting the social service requirements of the clinic: the individual who seeks a diagnosis for litigation purposes and the patient who has been under medical management elsewhere and is not satisfied with his progress.

Assuming, however, that the patient is eligible for clinic registration, he must be checked for an admitting diagnosis. The examining room physician must rapidly assemble the subjective complaints and objective findings in order to assign the case. In spite of the fact that the admitting room physician exerts every possible means to arrive at some accurate diagnosis, too many cases are referred to other clinics. If enough data are available, the occupational disease clinic should see the case and rule out the industrial exposure.

Clinical teamwork is necessary. A cutaneous rash due to chrome is just as important to the occupational disease clinic as it is to dermatology, and, while the blood picture from benzene poisoning is dramatic to the student in hematology, it is also of value for demonstration purposes in an occupational disease clinc.

The medicolegal involvements encountered in administering an occupational disease clinic are unfortunate. This is due to laws and regulatory bodies which tend to impede the objectives of sound medical education in this specialty. In order to retain public and professional confidence to which medical education is entitled, such a clinic might be required to curtail its activities and efforts.

The frequent demand that clinic instructors comply with subpenas issued for their appearance for hearings before boards of arbitration and compensation works a hardship and is annoying as well as time consuming to clinic personnel. It frequently discourages further collaboration on the part of other clinics which do not desire to become involved in litigated cases. Perhaps this can be overcome if those who must be summoned are subpenaed as factual witnesses and not as expert witnesses.

The university must insist on and the clinic follow a totally neutral and unbiased attitude toward the patient and industry. Reports and findings should be uncolored and prepared as facts which have been carefully weighed for significance and fairly interpreted according to the best available knowledge in the field.

Full time and part time industrial physicians should participate regularly in the conduct of such clinics. There are many universities that already have on their faculty physicians who are in charge of medical departments in industry. Additional physicians should be appointed if necessary according to univer-

sity standards and with a definite faculty rating. These physicians could present occupational diseases under their supervision, especially questionable cases for work-up, since these companies are already providing the worker with the necessary benefits provided for under the law. These physicians should be expected to demonstrate their cases, offer lectures, participate in staff conferences and engage in special research problems when indicated.

The private practitioner should have available the facilities of the clinic if the university can be spared the annoyance and responsibility of becoming involved legally. Perhaps a form could be prepared by the university legal department such as an operating permit for surgery. A report of the diagnosis would, of course, be furnished the physician who referred the case, and after the patient had been demonstrated to the clinic he would be automatically returned to his own physician for management.

Industrial commissions should agree to refer all cases in which petitions for compensation are filed to such a clinic for complete work-up. This would not mean that every case referred would be automatically considered an occupational disease, since awards are not made on all petitions filed. It would provide the commissions with factual data to assist these boards and arbitrators in their final decision for recommendation or denial of compensation.

A satisfactory procedure for developing and operating such clinics is essential, and the whole problem should be examined critically and sympathetically if a working plan is to be developed.

DISCUSSION

DR. VICTOR HEISER, New York: It has been my hope that the medical profession would not show that same lack of vision in industrial health that it showed with regard to the public health movement. At the beginning of the century there was created a huge demand for health officers that the medical profession was not ready to supply. Doctors everywhere accepted these jobs and largely discredited the movement in the beginning. The Rockefeller Foundation had to create schools of public health to provide teachers and to put the public health movement on a preventive basis. In industrial medicine we shall be able to avoid this mistake if we show the necessary vision. We can educate management in a short while to demand good industrial medical service, but the program cannot be pushed too hard because qualified doctors are not available to take these places. The medical profession, therefore, is losing a great opportunity for profitable employment. By others in the so-called social groups, it is forced into a subordinate position. The educational attainments of the physician should put him in the position of leadership. We can adequately meet the demand when we start some schools of industrial hygiene. A committee of the American Public Health Association has been at work on a suitable curriculum for some years. It is desirable to bring some concept of industrial medicine into the mind of the medical student, but at the most he cannot be taught very much. He cannot be taught enough to give the kind of service that industry has a right to expect. Industry feels that it should not teach doctors their business but that they should be able to find ways and means of doing that themselves.

DR. WALTER L. BIERRING, Des Moines, Iowa: The short courses that have been established at the schools of public health at Harvard, Johns Hopkins and the University of Michigan offer an opportunity for the general practitioner to obtain a fundamental knowledge of industrial hygiene and industrial medicine.

DR. CARL-GUSTAF TILLMAN, Topeka, Kan.: Not only does industrial medicine concern itself with problems that are specific to it, but inherent within the industrial organization are other hazards which have emotional repercussions exerting secondary effects on the body and particularly the efficiency of the worker. The industrial physician must acquaint himself with sufficient knowledge of psychiatry that additional functions belonging to him will not be taken over by other agencies in the public health field. The interpersonal relationships within industry are as important to the worker's health as the physical hazards.

JANUARY 13—MORNING

DR. HARVEY BARTLE, Philadelphia, in the Chair

Conservation of Man Power in Connecticut

DR. CLIFFORD KUH, New Haven, Conn.: At the first meeting of the Committee on Industrial Health of the Connecticut State Medical Society in 1938 it was decided to approach the problems of industrial health in Connecticut jointly with the Manufacturers Association of Connecticut. The state society committee is made up of full time and part time industrial physicians, the director of the bureau of industrial hygiene in the state department of health, and several other full time public health administrators. To satisfy the immediate needs of physicians, a postgraduate course in industrial medicine has been given, a section on industrial health has been organized in the medical society, and a regular department on industrial health has been arranged for in the *Connecticut State Medical Journal.*

A joint enterprise of the manufacturers' committee and the committee in the medical society was the preparation of a brochure, "Conservation of Man Power," which was widely distributed. It comprised discussions of the objectives of industrial medical service, the functions of the plant medical department, organization of the industrial medical service and a plan for assisting industries in the discovery and control of industrial health problems. In the brochure an inquiry form was distributed to be completed and returned by manufacturers. This plan enabled the manufacturer to request specific assistance in developing a health program and enabled the committee to survey existing industrial health facilities based on information supplied by the manufacturer. The questionnaire data which was assembled and distributed to seven hundred and forty manufacturers indicated that most aspects of medical care were inadequately developed or were at a minimum or absent in smaller plants, that first aid and emergency treatment were well developed, with minimal utilization of other medical technics and that dental service is infrequent. The smaller the plant the greater the disadvantage in supplying all forms of adequate medical supervision. These findings agree with similar surveys conducted by the Council on Industrial Health and the National Association of Manufacturers. In the plants employing full time industrial physicians there were an average of two thousand two hundred and four workers per doctor. If this figure is accepted as the minimum justifying employment of a full time medical service, there should be fourteen additional full time industrial physicians employed in appropriate plants in the state. It was concluded also that twelve additional plants should provide part time service. Nursing care is received by 67.4 per cent of the workers included in the survey. Medical quarters were provided for 79 per cent of workers studied. Hospitalization insurance was provided for 78.7 per cent of the workers.

The manufacturers have been quick to appreciate the shortcomings revealed by this survey. A series of articles on the relation of health to armament production is appearing in *Connecticut Industry.* Within the last eight months the executive secretary of the state medical society has placed about twenty full-time doctors in the larger establishments. The manufacturers have called for the appointment of a subcommittee on standardization of medical practice and terminology, in the interests of uniform administrative procedure, physical examinations and record keeping. Another subcommittee will report on problems of the general health of workers, stressing particularly the nonoccupational implications. To interest more manufacturers, particularly the smaller ones, in developing a health program, a forum or clinic on health in industry is being developed in which both industrialists and doctors will participate, using the shortcomings revealed in our survey as a theme for discussion. Plans now call for a concerted effort to amalgamate the activities of all state groups interested in the development of industrial health—the State Defense Council, insurance companies, social agencies, Yale University School of Medicine, professional groups and manufacturers. Research will be conducted at Yale University in absenteeism records in smaller plants, the routine examinations and therapeutic work being done by local part time industrial physicians. This entire

project will be under the scrutiny of a special committee of the New Haven Medical Association for a trial period of two years. Cooperation, therefore, is also possible at the city level. In this connection an industrial health and safety exposition will be conducted at the New Haven Y. M. C. A. under the sponsorship of the local board of education, WPA, the health department, the Defense Council, the Foremen's Club, the chamber of commerce and the County Manufacturers Association. Educational material is being drawn from many sources on health and safety projects. If successful, it is planned to interest other local manufacturers in an attempt to influence public opinion directly in industrial health measures. Another innovation concerns the trade schools of the state, operating under the state board of education, which are investigating the desirability of instituting a health program for future workers preparing for industry. Each school will be considered as an industrial unit requiring the service of a part time industrial physician.

The most encouraging sign has been the cooperation of the State Manufacturers Association, which recognizes an obligation to meet the immediate needs of the war program through extending medical service into more plants and improving the quality and usefulness of that service.

DISCUSSION

MR. MARSHALL DAWSON, Washington, D. C.: The doctors should bear in mind that the great need of the nation is full utilization of all available man power. Unfortunately, in the past premedical examinations have been used as a means of screening out the labor supply and some employers have used this ostensibly admirable device to gain a competitive advantage; that is, as a means of skimming the cream from the labor market. It is timely to remind all physicians that there must be a shift in the accent and that they must throw the full weight of their influence into the use of these examinations as aids to proper placement and as aids to the reconditioning of impaired workmen.

Health Education for Industrial Workers

DR. LEVERETT D. BRISTOL, New York: Health education for industrial workers has evolved more slowly than health education in the school, in the home or among the population in general. Our present war efforts emphasize the need for greater attention to health education in order to conserve our human resources.

In 1939, the National Industrial Conference Board carried on a study of medical and health programs in industry, based on a questionnaire which was an adaptation of a survey form and on personal visits to many industrial plants. It was found that health education programs were maintained in approximately 60 per cent of the plants surveyed. The mediums used were health posters in 91.7 per cent of the plants, health bulletins and reports in 81.7 per cent, personal health interviews in 69.4 per cent, health articles in employee magazines in 33.9 per cent, group health conferences in 31.7 per cent, motion pictures in 9.4 per cent, formal health classes in 5.6 per cent and payroll inserts on health in 1.7 per cent of the plants. The United States Public Health Service has recently prepared a series of health pamphlets for industrial workers to stimulate interest by presenting in brief, attractive form the simple facts about (1) specific occupational hazards, such as fumes, dusts and toxic chemicals and (2) common health hazards such as upper respiratory disorders, appendicitis, heart diseases and pneumonia. In view of the rapid growth in industrial and governmental production resulting from the nation's war efforts and the associated concentrations of population and increasing health problems, the Public Health Service also has made available special health education consultants to various areas, particularly for work with state and local industrial hygiene units.

Health education is carried on through addresses, lectures, class instruction, informal talks, personal interviews, radio and talking pictures and through magazine articles, bulletins, leaflets, posters, charts, exhibits and silent films. In recent years the project or demonstration method has taken an important part. "Teaching by telling" has given way largely to the more practical and successful method of "learning by doing." Any health education program for industrial workers must be continuous, varied, repetitive and motivating.

It would seem to be of special value to prepare health literature within the company for its own use. Needs and conditions, particularly among smaller industries, may be such that it is more feasible and economical to use health literature, posters or motion pictures prepared by outside organizations. Education material should be positive rather than negative and should stress "keeping fit" rather than placing emphasis on disease and medical treatment. Above all, material must be scientifically accurate. However, special diseases and abnormal conditions, particularly of an occupational nature, must be covered, but the preventive aspects always should be stressed.

It is desirable to have new employees attend at least one general talk on health and safety, particularly if any specific occupational hazards are associated with the work. The more active educational promotion of preventive geriatrics will do much to control those insidious diseases of our advancing years.

An interesting example of an organized group health education activity in industry is afforded by the experience of the associated companies of the Bell Telephone System. The course is voluntary and is given outside the employees' regular hours of work. Essential health facts are presented from the point of view of the effect of health on appearance and personality.

Other educational technics in industry include the so-called "Health Quiz," "Health Information, Please" or "Medical Explanation, Please," patterned on the popular panel discussions of various recent meetings and the radio feature "Information, Please." The Western Electric Company inaugurated a series of such meetings at its Kearny plant in New Jersey in 1940. Sessions cover a half hour at noontime every three or four weeks, particularly during the fall, winter and spring months, when sickness incidence is the highest. The experts consist of a group of four or five physicians chosen from the full time or part time doctors associated with the company, although frequently a "guest" physician may be included in the panel.

Attention should be called to the opportunities which industrial management and workers may have in the use of (*a*) community services for health education, including those provided by public and private health agencies and local educational institutions, insurance companies and medical societies, and (*b*) the more recently established health museums, such as the American Museum of Health in New York City and the Cleveland Health Museum in Ohio, which include visual educational material on industrial health.

The American Medical Association maintains an active Bureau of Health Education at its headquarters in Chicago. This bureau has prepared and made available (*a*) booklets and leaflets on various subjects in the field of adult hygiene and (*b*) pamphlets and technics in health education, such as radio speakers' bureaus, meetings and newspaper columns. It already has supplied some of the larger industrial organizations with thousands of copies of health posters and inserts to be used in employee magazines. The Bureau of Health Education and the Council on Industrial Health are cooperating in various ways and are now formulating a joint plan for making radio talks available on timely subjects in the field of industrial health. *Hygeia*, the popular monthly health magazine edited and published by the American Medical Association, is an excellent means for health education in industry.

Measurement of results is certain to be quite difficult of application to industrial groups. The Metropolitan Life Insurance Company, after more than thirty years of experience, has come to the conclusion that its health education results are both measurable and favorable. It may be none too early for business executives, plant supervisors and industrial medical and nursing personnel to set up cooperative plans for the final evaluation of their health education programs in terms of goal-attaining results.

DISCUSSION

DR. ANTHONY J. LANZA, New York: At the present time an active movement is on foot to set up first aid courses for employees. There is an excellent opportunity for combining with this first aid instruction other matters concerned with health education and, particularly, important aspects of personal hygiene and nutrition.

DR. FRED J. WAMPLER, Richmond, Va.: One important industry near Richmond has incorporated a health education program with safety education. As a result the absenteeism record for this one plant of nearly four thousand people has been reduced 50 per cent in two years.

Débridement, Suturing and Chemotherapy

DR. EDWARD L. HOWES, New York: This discussion will be limited to the treatment of the acute traumatic wounds, because this is the type seen by the industrial surgeon.

Antiseptics have generally been abandoned. Neither antiseptics nor irrigations remove or destroy bacteria ground into the tissues or the associated foreign bodies or the contused tissue on which 95 per cent of the bacteria grow.

Débridement is the only therapy which will remove this contused tissue containing the foreign bodies and the bacteria. Chemotherapy will not do it. Moreover, débridement should be done regardless of whether the wound is to be sutured or not. After the débridement the edges of the wound may be sutured, if they can be approximated without tension. As little suture material as possible should be employed and no drainage.

Neither muscle nor fat has any ability to hold sutures, so that they need not be sutured. Fascias and septums have a capacity to hold them and therefore should be sutured. The wound repaired in this manner needs a splint and elevation of the wounded part. The result is optimal healing in a satisfactory percentage of cases.

In industrial surgery Overton has reported an incidence of infection of only 0.85 per cent in the treatment of two hundred and forty-seven consecutive wounds treated by débridement and primary suture. The percentage of infection in clean operative wounds at Presbyterian Hospital, New York City, has never been lower than 1.4.

Neither from the standpoint of result nor from the point of view of the reactions of the tissue does there seem to be any indication to use sulfonamide derivatives locally in wounds properly treated by débridement and primary suture. The crystals of these drugs are foreign bodies. Allen and Mason have shown that they cause hemorrhage and gelatinization around sutured tendons. Jenkins has found that they cause almost as much leukocytic infiltration into sutured tissues as implanted feces. Sulfonamides should be used locally when the surgery is inadequate, precarious or dangerously late.

Chemotherapy started by mouth just after the wound is repaired is invaluable. It is needed for massive wounds, for those about the face where cavernosinus thrombosis is to be feared, for the wound of the scalp with the undepressed fracture line beneath, for the wound of the intestine, for the laceration of the face compounded into a frontal sinus, for the compound fracture and for many others.

There is every reason to use sulfonamides locally when the wound is left open. Open wounds must resist bacterial invasion over a longer period of time than sutured wounds.

Immobilization in plaster casts should be used in extensive wounds in civil practice, although its general adoption will never be as widespread as in war surgery.

The Field of Industrial Ophthalmology

This report by the Committee on Industrial Ophthalmology, Section on Ophthalmology, American Medical Association, Dr. Albert C. Snell, chairman, appears in full in this issue, page 610.

Placement of the Industrial Employee

JOSEPH TIFFIN, PH.D., Lafayette, Ind.: It is well known to every plant manager that it is much easier to obtain machines that are equal in efficiency than to obtain employees who are equal in their ability either to operate the machines or to learn to operate them. Employees vary from those who produce only 65 per cent of average production (i. e. 35 per cent less than average) to those producing 140 per cent of average production. This means that there is a ratio of more than 2 to 1 between the production of the best and the poorest employees. One of the major problems of the modern personnel or employment manager is to hire for each job employees who are most likely to achieve the higher levels of production on that particular job.

The personal differences which account for these differences in production cannot all be accounted for in terms of standard procedures of checking the applicants. Rather, the differences are essentially due to differences in aptitude for the different jobs, and aptitudes vary from one applicant to another, even among applicants who are entirely qualified from the physical or medical point of view.

The evidence is growing more and more that certain test procedures when used as a supplement to the procedures now in use will still further increase the effectiveness of employee placement in industry. Examples of this work might also be taken from the field of paper and pencil testing, sometimes called mental testing or intelligence testing. We proceed by determining whether a certain paper and pencil test succeeds in selecting employees for certain jobs who are more adapted to that job than would have been the case if the employees had been oherwise selected.

About two years ago we began a series of experiments in which were analyzed tests of the visual performance and ability on the job of approximately fifteen thousand industrial employees engaged in a variety of industrial jobs. Various measurements of the job performance ability were obtained in order to find out whether the employees with good vision were producing more on the job or for other reasons were more desirable employees than those with poor vision, and, if so, which particular vision tests were most accurate in picking the satisfactory employees. In some cases the performance of the employees on the job was represented by production records. Accident records were obtained to determine whether or not there was any relationship between the frequency or severity of accidents and the visual performance of the employees.

In the analysis of the data gathered it became apparent that no single visual test is adequate for the placement of employees and that reliance on a single test may in some cases do more harm than good. In one survey it was found that one can make no prediction at all of the acuity of a person at 16 inches after he has been tested at 20 feet. Nor can one predict anything about a person's acuity at 20 feet after he has been tested at 16 inches. The general conclusion in the light of these correlations is that one cannot select the best adapted employees for a 16 inch work distance using only an acuity test given at distance. The solution to this problem probably lies not in the abandonment of acuity testing but in the standardization of testing procedures at distances which are related to productivity on the job.

Having determined that color vision may appear in greater or lesser degree, we analyzed the data to determine what changes, if any, in color vision occur with increasing age. Color vision decreases steadily with age. Seventy-five per cent of the employees between the ages of 20 and 25 were able to pass the four item test; only 30 per cent of employees above the age of 55 retained this degree of ability to discriminate colors.

The implication of these results for the field of industrial allocation of trainees is great. Consider, for example, the case of a color pressman in a printing industry. This job requires approximately ten years of training for expert performance. New men are ordinarily selected for training at ages from 20 to 25, thus reaching their full level of productive efficiency at ages from 30 to 35, with their most productive years as trained operators between the ages of 35 and 50. But in the normal course of growing old most, if not all, of them are going to lose some of the ability to discriminate colors which they had when the training began. It is very important, both to the employees and to the company which is standing the expense of their training, to be sure that training is given only to men who not only have enough color discrimination successfully to learn the job but also have enough surplus of this ability so that after losing some of it with age they will still have a sufficient amount left to perform the job.

Working in collaboration with Dr. Kuhn, we began a series of experiments with occupational eye wear patterned after early experimental work of Weston and Adams in England. A number of hosiery workers engaged in an 8 inch job were divided into two groups. For all of the operators in one group Dr. Kuhn prescribed spectacles which, though varying from one individual to another according to the results of a refraction, generally followed the principle of giving from 1 to 2 diopters more plus lens than an orthodox prescription would call for. The experimental group began to gain in production in comparison with the control group until at the end of the twenty-six week experimental period the experimental group was producing 104 per cent of the production of the control group. Apparently the use of plus lenses which relieve the strain of continuous accommodation required by the job was of sufficient help to the employees in this group to enable them not only to catch up with but to exceed the production of the employees who did not have this advantage.

JANUARY 13—AFTERNOON

DR. ROBERT T. LEGGE, Berkeley, Calif., in the Chair

Conservation of Hearing in Industry

C. C. BUNCH, PH.D., Evanston, Ill.: This article appears in full in this issue, page 588.

Recent Trends in Physical Examinations Under Civil Service

DR. VERNE K. HARVEY, Washington, D. C.: This article appears in full in this issue, page 597.

Indiscriminate Administration of Vitamins to Workers in Industry

This report, prepared by representatives of the Council on Foods and Nutrition and the Council on Industrial Health, appears as a combined council report in this issue, page 618.

DISCUSSION

DR. GEORGE R. COWGILL, New Haven, Conn.: This report makes it clear that there is no objection to the administration of vitamins to employees under special circumstances when the need has been carefully studied and scientific data exist to support such a practice. The Committee on Nutrition of the National Research Council is preparing a more extensive discussion of this whole problem, but in respect to the widespread administration of vitamins in industry its attitude is exactly the same as reported to this congress. More emphasis is needed to educate the people about food values and the selection of a good diet. The Office of Nutrition in Washington has expanded a great deal in this direction. Various nutrition committees have been established in the states, and sound experience and programs which have proved practical in one locality are relayed to every other state unit. These nutrition committees have been made a part of the state councils of defense, a very desirable arrangement, since questions having to do with food and nutrition are automatically referred for proper consideration. In this way numerous suggestions are also received from medical societies, industries and other groups represented on each defense council. Every type of organization in the community will be used to train people how to provide a good diet. Industrial plants can contribute in an important way to this educational program. Posters are being developed for display in cafeterias and workrooms. But education of the worker alone is insufficient. His wife decides what food will go into his lunch basket and what food will be served in his household. It is necessary, therefore, to arrange to train the wives of workers through attendance at nutrition classes and by the use of literature and posters of all kinds. Suitable inserts can be handed out with pay envelops, although in some plants adoption of this plan is likely to lead to the suggestion that the worker's pay be increased to provide better food. The information contained in this report must be brought to the plant managers. If we can educate every one about food values, vitamin dispensing will simmer down to use in the treatment of recognized nutritional deficiences. If we can educate workers and housewives to select a good diet, we shall be able to support proposals suggesting that the American people cut down on the use of certain foods and eat more of other types in order to release material for shipment to allied countries. If the average citizen understands what is involved, we shall get full support in our program.

MRS. MARY R. DANGREMOND, Chicago: In face of all evidence presented, why are the Army and Navy considering vitamin capsules?

DR. J. S. MCLESTER, Birmingham, Ala.: Many soldiers taken into the Army are undernourished. Vitamin preparations will be used to improve the nutritive status of those soldiers for short periods. Also there are times when a soldier cannot get a well balanced diet. When he is living on emergency rations it is well to supplement his diet. There are times when much depends on the accuracy of a soldier's, aviator's or sailor's vision, whether or not he has the full requirement of vitamin A.

DR. W. G. THUSS, Birmingham, Ala.: Is there any evidence to show that the practice of giving vitamin preparations to bus drivers relieves night blindness?

DR. MCLESTER: If the driver is already well nourished there is no advantage in giving him vitamins. It is much better that he be assured of an adequate diet.

Medical Service Plans for Small Industries

DR. MYER S. BLOOM, Binghamton, N. Y.: In previous articles in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION I have discussed the development and operation of a plan for freedom of choice of physicians in industry. The details of this plan have now been in operation for ten years. The plan has demonstrated the feasibility of giving the worker complete freedom in the selection of his physician. It was pointed out that this method was susceptible of being extended among diversified industrial organizations at a very reasonable cost. Efficient, adequate medical and surgical care to the satisfaction of patient and physician alike are provided under the mutual benefit associations.

My experiences as medical director at the Dunn and McCarthy shoe factory, extending over a period of twenty-five years, pointed the way to working out the various other mutual benefit associations. The total average annual cost per member for medical services at the Dunn and McCarthy shoe factory during nineteen years was $17.05 for an almost complete medical coverage. At present every employee of Dunn and McCarthy is eligible to membership after having worked for the company one month. Members must actually pay dues for a period of two months before they are entitled to any benefits, six months to be eligible for hospitalization and operation, eye examinations, x-ray and extraction of teeth and one year before receiving sick benefits when operated on. Benefits are paid in case of illness, quarantine or accidents occurring outside the factory beginning with the second full week of illness. In case of accidents which occur in the factory, benefits are paid for only the first week of disability. No member can draw more than ten weeks' sick benefits in any one year, and not more than $350 can be spent on any member in one year.

Following our success at the Dunn and McCarthy plant, associations were set up at the Agfa Ansco Division of the General Aniline and Film Corporation, Cary and Company (manufacturers of children's clothing), Spaulding Bakeries Incorporated, Truitt Brothers (shoe manufacturers), the Binghamton Die and Machine Company, the Ozalid Products Division of the General Aniline and Film Corporation and the Gotham Shoe Manufacturing Company.

It was with the Spaulding association that we elected to try a new departure in industrial medicine by giving the employees the privilege of choosing their own physicians. This new system was successful at Spaulding's Binghamton plant. It was then extended to the Elmira and Oneonta plants in 1934, the Wilkes-Barre, Pa., plant in 1935 and the Middletown plant in 1936. I believe that when the Spaulding employees were allowed complete freedom in the choice of their physicians this was the first time such privilege had been granted by any organization.

In each of the Spaulding mutual benefit associations (Binghamton, Elmira, Oneonta, Wilkes-Barre and Middletown) the setup is essentially the same. Major and minor operations, eye examinations, hospitalization for thirty days a year at $3 a day,

house and office calls (limited to $50 a year) and x-ray and extraction of teeth (limited to $25 a year) are allowed. Not more than $350 can be spent in one year on a member.

Our experience indicates that with proper administration and with cooperation between the benefit associations and the local medical societies this type of service to the worker can be provided in industry on a basis of complete freedom of choice of physicians. Successful development of such mutual benefit associations depends to a large extent on low overhead, anticipation of costs and the ratio of male and female employees in the industry concerned. These plans have been in successful operation for a sufficient number of years to prove their feasibility and financial soundness.

DISCUSSION

DR. KINGSLEY ROBERTS, New York: I should like to ask if any formal agreement was made with the local county medical societies about acceptance of this plan before it was very far under way?

DR. MYER S. BLOOM, Binghamton, N. Y.: I originally set those fees a good many years ago after discussion with some of the leading doctors at that time. All did not agree in the beginning and some were not particularly interested in doing industrial work. However, any employee who wanted to go to these doctors would receive his allowance. The difference they would have to make up themselves. We notified employees about extra charges. In Broome County we have approximately two hundred doctors, one hundred and eighty-eight of whom are members of the county medical society. During a four year period at the Binghamton plant of the Spaulding Bakery one hundred and seventy-two doctors in the county were paid, eighteen of whom lived outside the city. At Agfa Ansco, during the year 1940, we employed one hundred and thirty-six doctors in the city and thirty-eight from surrounding towns. We paid doctors' bills in fifty-two cities and fifteen states. We naturally have no control over the physicians outside the city, and when a receipted bill for doctor's services or hospitalization was presented we paid whatever would have been allowed in our own local community.

ATLANTIC CITY SESSION

Alumni and Fraternity Luncheons

Officers of medical alumni associations, medical fraternities and other groups who wish to have luncheons, dinners or banquets at the time of the annual session of the Association in Atlantic City, June 8 to 12, are urged to communicate with Dr. Daniel C. Reyner, 2703 Pacific Avenue, Atlantic City, N. J., the chairman of the Subcommittee on Alumni and Fraternity Reunions of the Local Committee on Arrangements.

MEDICAL ECONOMIC ABSTRACTS

MICHIGAN MEDICAL SERVICE

On Nov. 30, 1941 the enrolment of the Michigan Medical Service had reached 450,000. This makes the Michigan Medical Service the largest voluntary medical service plan in the world. "This expansion," says the *Journal* of the Michigan State Medical Society of January, "has been necessary to assure a cross section for average experience but has also meant a number of problems which are gradually being solved." February 28 will mark the completion of the second year of operation. During the first year $200,000 was paid to doctors of medicine for services to subscribers. During the second year this payment will exceed $1,000,000. Since October 1941 100 per cent of the schedule of benefits has been paid. In three counties 100 per cent of the physicians are enrolled and in thirty-six additional counties 80 per cent or more have accepted services under the plan.

The rapid growth of the Michigan Medical Service in recent months has somewhat intensified the inevitable difficulties of any extensive and rapidly growing prepayment plan for medical care. This is a voluntary organization, operated by the Michigan State Medical Society. Disagreements and difficulties are not settled by autocratic edicts and regulations but by the democratic process of a referendum of the medical society membership. The referendum was initiated and confined to the membership of Wayne County (Detroit) but probably gives a fairly accurate picture of the extent of approval of and dissatisfaction with certain controversial features of the plan.

There were 962 returns, of which 686 were from surgeons and therefore especially concerned with the operation of the section of the plan having the widest scope. Of those voting, 733 were participating in the operation of the plan, 215 were nonparticipating and 60 were not in practice. Of the participating members, 48, or about 7 per cent, expressed general dissatisfaction, while 25, or about 11 per cent of the nonparticipating voters, were dissatisfied.

Several of the questions asked for opinions on specific points and the replies were suggestive in determining the professional attitude toward a number of features of prepayment plans. The fact that 10 to 20 per cent of those replying to the questionnaire had not fully understood the provisions for additional payments by patients in the higher income classes in excess of those paid by the plan or for additional payments for certain special services not covered by prepayment would seem to indicate either inadequate educational work or indifference by physicians to the provisions of the plan adopted by their own organization. That nearly 70 per cent answered "no" to the question "Are you satisfied with the present plan as applied at present?" probably indicates the need for some revision. One direction of the revision may be shown by the majority vote in "favor of a plan which incorporated cash indemnity or limited liability insurance."

There was almost an even vote on the questions of whether the present schedule for the low income group, if paid 100 per cent, is proper. Nearly one half voted that it was "too low." There was a decided majority against raising the income limit and considerable opposition to such a change even if those to be included above the income limit receive the regular payments of the plan only as a credit. Five hundred and three thought the income limits at present were proper but 295 thought they were too high. Perhaps an explanation of at least a part of this attitude is found in the fact that more than 50 per cent said that they had difficulty in collecting additional fees under the conditions proposed. There were some further implied criticisms of the administration in the answers to other questions, but nevertheless almost 80 per cent said that in view of recent changes of the administration they were "willing to cooperate in this plan for a period of six months if payments are returned to 100 per cent of the fee schedules."

WAR MARRIAGES

It is not the draft but the increase of employment in industry that is swelling the marriage statistics, according to the statisticians of the Metropolitan Life Insurance Company. During January and November 1941, marriage licenses increased 9 per cent over the same months of 1940 in thirty large American cities for a fourth of the nation's population; they increased from 30 to 40 per cent in the cities where defense production was the highest. In Baltimore and in Dayton, Ohio, centers of war industrial activity, the increase was almost 40 per cent. Other cities where war has multiplied industrial production and which showed increases were Indianapolis with an increase of 30 per cent, Hartford, Conn., 20 per cent, Providence, R. I., 23 per cent, and Worcester, Mass., 20 per cent. Increased employment in Washington was accompanied by one-third more marriage licenses in the first eleven months of 1941 than in the corresponding months of 1940. On the other hand, gains in the six largest cities of the country were less striking. In New York the increase was only 2.5 per cent, in Chicago 6 per cent, in Philadelphia 3.5 per cent, in Detroit 5.5 per cent, in Los Angeles 10 per cent and in Cleveland 2.25 per cent.

REPORT OF CALIFORNIA PHYSICIANS' SERVICE

In its report for July 1941, California Physicians' Service analyzed the number of office, home and hospital calls made by patients and doctors. Such statistics vary according to several human elements. Some physicians see patients more often than is necessary for minor ailments or carry the chronic case with frequent visits over a long period of time. Rural, urban and metropolitan areas differ as do the general practitioner and the specialist. The use of such substances as thiamine and hormone derivatives varies extremely. Some use hypodermic and others prefer oral medication.

Visits During January to July 1941

Month	Members	Total Visits	Visits per Thousand Members
January	21,936	12,327	562
February	22,948	12,163	530
March	24,107	14,497	602
April	24,500	13,584	553
May	27,057	13,394	495
June	27,632	13,763	498
July	28,518	13,137	460

A simple way of calculating an index of the number of monthly visits is by the number of visits per thousand of beneficiary members. It is found that there are wide seasonal variations in this figure, as is shown by the table for the first seven months of 1941.

OREGON PHYSICIANS SERVICE BUREAU

The council of the Oregon State Medical Society at a meeting on Nov. 8, 1941 discussed and approved the incorporation of an Oregon Physicians Service Bureau. This bureau is a central organization under control of the state medical society and will offer medical and hospital and related services in districts not now serviced through the Bureau of Medical Economics. This fills a long-felt need for large districts, where the physicians are too far apart to organize and operate properly their own bureau. It does not supersede the existing service bureaus and in no way interferes with their operations. It does create a central agency for writing statewide contracts which can subsequently be turned over to local bureaus for contract fulfilment.

This plan permits contracts to be made with such agencies as the Farm Security Administration on a uniform statewide basis. Such a project is being proposed with the Farm Security Administration in which there will be definite limitations, and initial rates will be subject to future changes as experience determines. Other federal and state agencies may be able to find a solution for their medical service problems in such an organization.

The Multnomah County Medical Society decided to gather some experience on family coverage in a higher income bracket by granting approval to the Multnomah Medical Service Bureau of its proposed contract with the postal employees and their spouses (not including their children).

WOMAN'S AUXILIARY

District of Columbia

The woman's auxiliary to the District medical society held its first meeting of the year in the medical society's building, with the new president, Mrs. Caryl Burbank, presiding. Dr. Henry R. Schreiber, president of the Medical Society of the District of Columbia, talked. Mrs. Ernest E. Hadley reported that sixteen new members had been added to the roster so far this year.

Mississippi

Mrs. H. K. Rouse, new president of the auxiliary to the Coast Counties Medical Society, was hostess for the first meeting of the new club year. Red Cross hospital surgical gowns to be cut and made by the members were distributed. Mrs. C. H. McCall was appointed chairman of this project.

Mrs. D. L. Hollis was elected president of the Biloxi unit of the Coast Counties auxiliary at a recent meeting.

Missouri

The Women's Auxiliary to the Missouri State Medical Association is sponsoring an essay contest among high school students again this year. Any high school student in Missouri may participate. The subject chosen is "Nutrition for Defense." Mrs. Frank L. Davis, 6123 Westminster Place, St. Louis, is essay contest chairman.

Oregon

A meeting of the auxiliary to the Polk-Yamhill-Marion County Medical Society was held in the home of Mrs. H. J. Clement, with twenty members present. Mrs. Baum, the president, reported that members had contributed $49.50 toward the *Hygeia* Fund. The auxiliary voted to contribute to the state fund and $1 toward the McLoughlin House chair, a project of the state auxiliary. Miss Isabel Gates spoke on work being done in the bean and hop yards in the way of Christian education for the children whose parents follow the crops.

A recent meeting was held in the home of Mrs. Carl Emmons, with thirty-three members attending. Mrs. Thelma Mitchell spoke on "Nutrition as a Factor in Civilian Defense." Dr. Ralph Purvine spoke to the group on distaster relief.

The study group of the Multnomah County medical auxiliary met at the home of Mrs. Laurence R. Serrurier recently. A movie reel was shown at Morningside Hospital for the Alaskan Insane on the insulin and metrazol treatment for dementia precox. A clinic was also given by Drs. John Haskins and Laurence R. Serrurier. The study group met also at the home of Mrs. F. H. Damasch. Mrs. Charles H. Manlove, president of the auxiliary, gave a book review on "You Can't Do Business with Hitler." The auxiliary met recently and discussed the subject "Our Part in National Defense." Miss Elizabeth Baldwin, member of the state nutrition committee, spoke on "Spending the Dollar According to the New Nutrition Standard."

Texas

The Liberty-Chambers Counties auxiliary met, recently, at the home of Mrs. Frank S. Griffin Jr., Liberty. The following were elected: Mrs. A. R. Shearer, Mont Belvieu, president; Mrs. W. H. Bridges, Mont Belvieu, secretary-treasurer, and Mrs. E. R. Richter, Dayton, parliamentarian. Mrs. Jack Bevil was elected vice president and president-elect. The auxiliary voted to continue a $2 contribution of each member to the memorial, student loan and George Plunkett Red funds of the state auxiliary.

The Wichita County auxiliary met at Wichita Falls with Mrs. S. F. Harrington, Dallas, president of the state auxiliary, as guest speaker. Mrs. M. H. Glover, president, introduced Mrs. Harrington, who spoke on "The Doctor's Wife in National Defense."

The Tarrant County auxiliary was entertained, recently, at the home of Mrs. X. R. Hyde, Fort Worth, honoring the president, Mrs. E. L. Howard. Seventy-five members of the auxiliary were present.

The Jefferson County auxiliary met, recently, in Beaumont. Dr. H. F. Ford, assistant professor of neurology and psychiatry, University of Texas Medical School, Galveston, spoke on "Mental Health—a Defense Measure."

The Lamar County auxiliary met, recently, at the home of Mrs. W. W. Fitzpatrick, Paris, with fourteen members present. The auxiliary voted to sponsor a health essay contest in rural schools and in the Paris High School.

The Tom Green Eight Counties auxiliary held a business session, recently, at San Angelo. Mrs. Carl A. Kunath, San Angelo, treasurer, reported that the auxiliary realized $85 from its recent rummage sale.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Examination for Resident Physicians.—The Los Angeles County Civil Service Commission has announced an examination for resident physicians at the Los Angeles County Hospital. Residencies are available in the following services: dermatology and syphilology, orthopedic surgery, otorhinolaryngology, pathology and pediatrics. Applicants between 21 and 40 years of age who have graduated with an M.D. degree from an approved medical school and have completed at least one year of internship in an approved hospital may file for the examination. Candidates must possess or be able to secure a physician and surgeon certificate to practice in California. County residence is not required and there is no written examination. Applications must be filed in room 102, Hall of Records, by March 3.

Society News.—The San Francisco County Medical Society devoted its meeting, February 10, to a symposium on nutrition; the speakers were Dr. Dwight L. Wilbur, San Francisco; Agnes Fay Morgan, Ph.D., professor of home economics, University of California, Berkeley; James Murray Luck, Ph.D., associate professor of biochemistry, Stanford University at Stanford University; Nina Simmonds, Sc.D., lecturer in medicine at the University of California Medical School, San Francisco, and Dr. Arthur L. Bloomfield, San Francisco.——The Los Angeles County Medical Association was addressed, January 15, by Drs. Ben L. Bryant, Los Angeles, on "Argyria Resulting from Intranasal Medication" and Lawrence K. Gundrum, Los Angeles, "Effect of the Newer Sulfonamides on the Nasal Mucosa of Rabbits."——Dr. Solomon Strouse, Los Angeles, among others, addressed the Los Angeles Heart Association, January 21, on "The Mind and the Emotions of the Patient with Heart Disease."——The Los Angeles Society of Neurology and Psychiatry was addressed, January 21, by Drs. May E. G. Romm, Beverly Hills, on "Emotional Problems in Adolescence" and Frank M. Anderson, Los Angeles, on "Acoustic Neuroma Within the Petrous Bone: Operative Removal."——Dr. Lester B. Lawrence, Oakland, among others, addressed the Alameda County Medical Association in Oakland, January 19, on "Diagnostic Tests for Intracranial Neoplasms."

CONNECTICUT

State Society to Observe One Hundred and Fiftieth Anniversary.—The Connecticut State Medical Society will hold a two day celebration at Wesleyan University, Middletown, June 3-4, to observe the one hundred and fiftieth anniversary of its founding. The first day will be devoted to a consideration of "Present and Future Trends in Medicine" with the following speakers: Mr. James A. Hamilton, director, New Haven Hospital, on "Medicine and the Hospital"; Dr. John L. Rice, health commissioner of New York City, "Medicine and Public Opinion"; Michael M. Davis, Ph.D., New York, "Medical Care and Its Distribution," and Mr. Thomas A. Hendricks, executive secretary of the Indiana State Medical Association, Indianapolis, "Medicine and the Public Knowledge." On the second day the speakers will include:

Governor Robert A. Hurley, Greetings from the State of Connecticut.
President James L. McConaughy, LL.D., of Wesleyan University.
The Mayor of Middletown.
Dr. Howard W. Haggard, New Haven, Connecticut Colonial Medicine.
Dr. Creighton Barker, New Haven, The Connecticut State Medical Society from Its Founding in 1860.
Dr. Stanley B. Weld, Hartford, The Connecticut State Medical Society from 1860 to the Present.

Dr. Fred W. Rankin, Lexington, Ky., President-Elect of the American Medical Association, will deliver the oration of the day and Dr. Logan Clendening, Kansas City, Mo., at the anniversary dinner will be the orator of the evening. To commemorate the anniversary, the state society plans to publish in book form writings by invited authors on the development of medicine in Connecticut, the volume to be entitled "The Heritage of Connecticut Medicine," a special issue of its state journal and a brochure for the general public dealing with medical and health matters of special interest emphasizing what one hundred and fifty years of medical service has done for the public welfare. The press and radio will also be utilized in marking the event and a comprehensive historical exhibit will be a feature at the session in Middletown.

DISTRICT OF COLUMBIA

Society News.—Dr. Reed M. Nesbit, Ann Arbor, addressed the Washington Urological Society, February 18, on "The Value of Cystometry in the Everyday Practice of Surgery and Medicine."——The Medical Society of the District of Columbia will be addressed, February 25, by Dr. Fuller Albright, Boston, on "Ovarian Deficiencies and Their Treatment."

Five Typhus Carrier Rats Trapped.—The District health department has reported that tests on the rats trapped in the Union Station area, Washington, have shown 5 to be carriers of endemic typhus. According to the Washington *Evening Star*, January 22, a house committee has been appointed to investigate rodent control in the District. At a meeting of this committee Dr. George C. Ruhland, health officer, stated that 5,000 rats had been captured in a recent rat eradication campaign.

Course in Psychiatry and Neurology.—The departments of psychiatry and neurology of the George Washington University School of Medicine opened a postgraduate course in psychiatry and neurology, January 30, to continue through May 16. Lectures, laboratory and clinical demonstrations comprise the course which is being conducted at the medical school and at Gallinger Municipal and St. Elizabeths hospitals. The subjects include the anatomy, physiology and pathology of the nervous system, clinical neurology, neurosurgery, electroencephalography, diagnostic roentgenology, clinical psychiatry, the psychoneuroses, military psychiatry and neurology, child psychiatry, forensic and administrative psychiatry, psychosomatic medicine, psychobiology and psychopathology.

ILLINOIS

Society News.—Dr. James H. Mitchell, Chicago, addressed the Sangamon County Medical Society in Springfield, February 5, on "Differential Diagnosis and Treatment of Dermatoses of the Hands and Feet."——The Adams County Medical Society was addressed in Quincy, February 10, by Dr. Chauncey C. Maher, Chicago, on "Management of Patients with Coronary Artery Disease."——Dr. William M. James, St. Louis, discussed "Diagnosis and Treatment of the More Common Eye Disorders" before the Madison County Medical Society in Granite City, January 2.

New State Criminologist.—Dr. Roy G. Barrick, Joliet, assistant to the state criminologist and superintendent of the diagnostic depot, Illinois State Penitentiary, has been appointed state criminologist effective February 1. He succeeds Dr. Paul L. Schroeder, Chicago, who asked to be relieved so that he could devote full time to directing the Institute for Juvenile Research and to his teaching as professor of psychiatry and head of the department of criminology at the University of Illinois College of Medicine.

Chicago

Society News.—Dr. Clayton G. Loosli addressed the Society of Illinois Bacteriologists, February 20, on "Production of Experimental Influenza in Mice by Means of Exposure to Air Borne Virus and Its Prevention by Propylene Glycol Vapor" and Major Hugh R. Gilmore Jr., Sixth Corps Area Laboratory, Fort Sheridan, "Preventive Medicine in the Army."——Dr. Carey P. McCord, Detroit, addressed the Chicago Society of Industrial Medicine and Surgery, February 2, on "New Industrial Medical Problems Created by Present Emergencies."——Dr. Phillips Thygeson, New York, addressed the Chicago Ophthalmological Society, January 19, on "Diagnosis and Treatment of Conjunctivitis."——The Chicago Pediatric Society was addressed, January 20, among others, by Dr. Douglas N. Buchanan on "Behavior in Organic Disease."——The Illinois Psychiatric Society was addressed, February 5, by Drs. Jacques S. Gottlieb, Iowa City, on "The Effect of Benzedrine Sulfate on Migraine" and Joan Fleming, "Observations on the Use of Chess in the Therapy of an Adolescent Boy."

New Wesley Hospital Opened.—Special ceremonies recently marked the opening of the new Wesley Memorial Hospital at Chicago Avenue, Superior Street and Fairbanks Court. Ernest Lynn Waldorf, D.D., resident bishop of Chicago, presided and Ernest Fremont Tittle, D.D., pastor of the First Methodist Church of Evanston, delivered the dedicatory address, on "Religion and Health." Dr. Raymond W. McNealy, superintendent of the hospital, made the presentation speech. A portrait of the late Mr. Eugene S. Gilmore, who served as superintendent of the old Wesley from 1908 to 1931 was unveiled in the board room. George Herbert Jones in 1937 gave about $2,000,000 in stock to finance the new hospital, which is planned as the first unit in a group of buildings to

be known as the George Herbert Jones Hospital Center. It is twenty stories high with a capacity of five hundred and twenty-five beds. The new hospital is affiliated with and adjacent to Northwestern University Medical School.

Latin American Physiologist to Give Hamburger Lecture.—Dr. Eduardo Braun-Menendez, director of cardiovascular investigations and lecturer in physiology, Faculty of Medical Sciences, University of Buenos Aires, Buenos Aires, Argentina, will deliver the first Walter Wile Hamburger Memorial Lecture of the Institute of Medicine of Chicago, March 3, in the Rothschild Auditorium of Michael Reese Hospital. His subject will be "The Mechanism of Renal Hypertension." This lecture marks the first activity under a special fund established by the board of governors of the Institute of Medicine in honor of Dr. Hamburger. The fund was originally intended as a gift to be presented on his sixtieth birthday in September 1941. Dr. Hamburger died on June 27, 1941. The fund was then designated as a memorial in his honor, the income to be used for the endowment of lectureships and scholarships or to finance any medical activity of the institute. Contributions are still being accepted. Dr. Hamburger was clinical professor of medicine, University of Chicago School of Medicine. He was also a member of the executive committee of the board of governors of the institute.

INDIANA

New Blood Bank.—The Lake County Medical Society has established a blood bank at St. Mary's Mercy Hospital, Gary, with storage facilities for about 1,000 pints of blood plasma, available for all the hospitals in the county. Excess plasma over the normal local requirements will be forwarded to the American Red Cross.

License Revoked for Practicing with Chiropractor.—The license of Dr. Robert B. McAlpin, Greenwood, was revoked recently on the charge of "gross immorality" in that he aided and abetted fraud by practicing with Heil E. Crum, chiropractor, lending his medical license in the illegal and fraudulent practice carried on by Crum with the use of the so-called "coetherator," according to the state board of medical examiners. THE JOURNAL (Dec. 6, 1941, p. 1992) reported that Crum employed a contrivance called an "etherator" or "coetherator" which was totally devoid of any therapeutic value. It was said to be a small wooden box with a number of holes in the front over which various colors of thin paper were pasted. On the inside was an ordinary light bulb with a cord for making contact with electricity. The bulb could be moved about so that the light would penetrate the various paper covered holes. The box contained a disconnected wire and a glass tube filled with hydrant water. There was a pedal and a dial on the outside of the box, neither of which had any connection with the interior. The patient would moisten a slip of paper with saliva and deposit it through a slot on the top of the box. Crum would rub the pedal with his thumb and repeat the popular names of diseases and organs of the body. The diseases which he claimed to be able to treat and relieve, and in some instances cure, were cancer, blindness, arthritis, nervous disorders, hemorrhoids, abscesses, kidney ailments, stomach disorders, leakage of the heart, skin ailments, ovarian trouble, varicose veins and tumors. Crum further claimed that he could lengthen or shorten a patient's legs, cause amputated fingers to grow back into place and restore teeth to their original condition. He said that it was not necessary for patients to be present or visit his office but that he could broadcast treatments to them wherever they might be located. The action of the state board of medical registration and examination in revoking Crum's license to practice chiropractic, naturopathy and electrotherapeutics was upheld by the Circuit Court and later by the Supreme Court. Dr. McAlpin graduated at the Medical College of Indiana, Indianapolis, in 1902 and was licensed to practice in Indiana the same year.

KENTUCKY

Society News.—Dr. Alfred M. Glazer, Cincinnati, discussed "Plasma Transfusions and Their Indications" before the Campbell-Kenton County Medical Society in Dayton recently. ——The Four County Medical Society was addressed recently by Drs. Charles H. Maguire and Lawrence T. Minish Jr., Louisville, on "Early Diagnosis of Gastrointestinal Malignancies" and "Pneumonia and Sulfonamide Therapy," respectively.

Jane Todd Crawford Memorial.—Plans are under way to construct a log cabin on the site of the former Crawford home, to be designated the Jane Todd Crawford Memorial. The Greensburg Woman's Club has secured a deed to a plot of ground on the farm with a road leading to it from the highway known as the Jane Todd Crawford Trail. This highway leads from the Crawford farm in Green County to the McDowell home in Danville and was named by the state highway department. A replica of the Crawford log cabin on the farm will be erected with used logs, the Works Progress Administration to furnish the labor. When the cabin is completed, an appeal will be made for funds to purchase furniture and finance the landscaping. It is planned to turn the property over to the state park commission.

MAINE

Society News.—Dr. Eugene H. Drake discussed "Syncope" before the Portland Medical Club on November 4. —— Dr. Terry M. Townsend, New York, addressed the Kennebec County Medical Association in Waterville, November 13, on "Relief of Prostatic Urinary Retention." —— The Penobscot County Medical Association was addressed in Bangor, November 18, on "Dysmenorrhea." Dr. Meyer Saklad, Providence, R. I., discussed "Choice of Anesthesia in General Practice" before the association recently.——The Knox County Medical Society was recently addressed in Rockland by Dr. Francis M. Thurmon, Boston, on "Extragenital Sores."

MASSACHUSETTS

Hospital News.—The Washingtonian Hospital, Boston, has been conducting a series of lectures on the treatment of alcoholism. Two of the lectures were given by Drs. Robert E. Fleming, Boston, on "The A-B-C's of Alcoholism" and Dr. Abraham Myerson, Boston, on "The Treatment of Alcoholic Psychosis."

Evans Memorial Lecture.—Dr. Alfred Blalock, professor of surgery, Johns Hopkins University School of Medicine, Baltimore, gave a lecture in the Robert Dawson Evans Memorial series, January 23, in the Evans Auditorium, Boston. His subject was "Traumatic Shock: A Consideration of Its Pathogenesis and Treatment."

Graduate Courses. — The winter series of postgraduate extension courses, which are conducted throughout the state under the auspices of the state medical society in cooperation with the state department of health and the U. S. Public Health Service, opened in Norwood for the Norfolk District, January 15, with a talk on "Head Colds and Complications." In nearly all cases, each series consists of eight weekly lectures on varied subjects. In addition to Norwood the following centers have been selected: Pittsfield, Fall River, New Bedford, Springfield, Winchester, Quincy, Milford and Fitchburg.

MICHIGAN

The Beaumont Lectures.—The nineteenth annual Beaumont Lectures of the Wayne County Medical Society were delivered at the Art Institute, Detroit, by Dr. Charles C. Higgins, Cleveland, February 2 and 9, on "Renal Lithiasis."

Hospital News.—The new Northwestern Branch of the Grace Hospital, Detroit, was opened on January 28. The new unit is situated on a 10 acre site, has a capacity of one hundred and eighty-seven beds, including thirty-five private rooms and sixteen four bedroom wards, and facilities for sixty bassinets. Dr. Kenneth E. Babcock, assistant director of Grace Hospital, will be in charge of the new unit.

Fifty Years of Practice.—Dr. Clarence P. Lathrop, Hastings, was guest of honor at a dinner given by the Barry County Medical Society, December 4, in recognition of his completion of fifty years in the practice of medicine. He graduated at Chicago Homeopathic Medical College in 1890. He has served as coroner of the county for many terms.——Dr. Lewis E. Cochran, Peck, recently completed fifty years as a medical practitioner.

Society News.—The Eaton County Medical Society was addressed in Charlotte, January 22, by Drs. Milton Shaw and Charles E. Black, Lansing, on "The Value and Technic of Autopsies" and "The Pathologist and the Mortician," respectively. —— Dr. Hazel R. Prentice, Kalamazoo, was chosen president-elect of the Michigan Pathological Society at its annual meeting and Dr. Henry E. Cope, Lansing, was installed as president. Dr. Donald C. Beaver, Detroit, is secretary.—— Dr. George B. Eusterman, Rochester, Minn., addressed the Wayne County Medical Society, Detroit, January 12, on "Problem of Gastric Carcinoma: Personal Observations on Manifestations of the Disease in Its Earliest Stages."——Dr. Claire L. Straith, Detroit, addressed the Muskegon County Medical Society, January 23, on "Plastic Surgery of the Face."——The Detroit Physiological Society was addressed, January 27, by Dr. Harry P. Smith, Iowa City, on "Problems in Blood Clotting."

NEW JERSEY

Personal.—Dr. Frederick G. Dilger, Hackensack, has been appointed medical director of the Newark office of the New Jersey Rehabilitation Commission, succeeding Dr. Henry H. Kessler, who resigned to enter active duty in the medical corps of the U. S. Navy.

Society News.—Dr. William T. Lemmon, Philadelphia, addressed the Gloucester County Medical Society in Woodbury, January 15, on "Acute Abdominal Emergencies with Their Diagnosis and Treatment."——The Hudson County Medical Society was addressed in Jersey City, February 3, by Dr. Russell L. F. Cecil, New York, on "The Problem of Chronic Joint Disease."——Dr. Arthur W. Allen, Boston, discussed "Gastric Ulceration and Early Cancer of the Stomach" before the Academy of Medicine of Northern New Jersey, January 15.——Dr. Norman H. Plummer, New York, discussed "Use and Misuse of the Sulfonamide Drugs" before the Passaic County Medical Society in Paterson, January 8.

NEW YORK

Cancer Teaching Day.—January 17 was designated "Cancer Teaching Day" at Syracuse University College of Medicine, Syracuse. The program, which was presented under the auspices of the Tumor Clinic Association of the State of New York, the university, the state medical society and the division of cancer control of the state department of health, was devoted to a symposium on the modern knowledge of cancer. The speakers included Drs. Bowman C. Crowell, Chicago, and Byrl R. Kirklin, Rochester, Minn.

Obstetric Consultant Service.—Plans have been announced to establish an obstetric consultant service in the state for patients unable to pay for private consultation. National funds have been made available, to be paid through the state department of health. Consultants will receive the stipulated fee of $15, including travel. The plan is not intended to interfere with consultation in private practice. It will cover welfare cases, but patients need not have a relief status. The plan also aims to have available consultant service in all areas so that the individual physician needing obstetric consultation for any emergency can get such help from the district health officer, who will have the list of consultants. County medical societies are being asked to provide the subcommittee on maternal welfare of the state medical society with lists of qualified obstetricians who are willing to cooperate in the project. The state department of health will make the final appointments and supply the names to the district health officers.

Typhoid Carriers.—The state health department recently published a report on the first ten years' experience with release specimens for typhoid cases to ascertain the age and sex distribution of an unselected group of carriers. Between Jan. 1, 1930 and Dec. 31, 1939 there occurred 3,750 typhoid cases in New York State, exclusive of New York City and state institutions. Four hundred and thirty-four patients died and 122 others were not followed for a sufficient time to determine whether they were eligible for release or for declaration as chronic carriers. These 556 individuals were excluded from the tabulation, leaving 3,194 cases of typhoid which gave rise to ninety-three chronic carriers. Release is accomplished by meeting the Sanitary Code requirement of having two negative stools with an interval of five days. According to the state health department almost one half of the typhoid cases occur at ages under 20, yet only 5.4 per cent of the carriers come from this age classification. In this group the males outnumbered the females as cases in the ratio of approximately 11 to 9, but females outnumbered the males as carriers in the ratio of 3 to 2. The report points out the fact that almost 15 per cent of women who have typhoid between the ages of 40 and 59 become chronic carriers.

New York City

Fellowship to Honor Dr. Niles.—The creation of a fellowship in honor of the late Walter Lindsay Niles, who at the time of his death on December 22 was acting dean of Cornell University Medical College, has been announced by the University and New York Hospital. An endowment fund of $100,000 is now being raised to provide annual awards to "outstanding young men entering the medical profession."

Dr. Hetrick Named Dean of New York Medical College.—Dr. J. A. Werner Hetrick, acting dean of the New York Medical College, Flower and Fifth Avenue Hospitals, since March 1941, has been appointed dean of the school, filling the vacancy that occurred on the death of Dr. Claude A. Burrett. Dr. Hetrick graduated at the school in 1918, joining the faculty in 1921 as a member of the department of otolaryngology. In 1929 he became professor and head of the department of otolaryngology. He was named assistant dean in 1924 and associate dean in 1939. Dr. Hetrick is 46 years of age.

Forum on Venereal Diseases.—The New York branch of the American Association of Scientific Workers on Venereal Disease Problems in the Army and Civilian Defense Areas sponsored a forum at the Men's Faculty Club, Columbia University, January 7. Dr. Ernst P. Boas, assistant clinical professor of medicine of Columbia University College of Physicians and Surgeons, acted as chairman and the speakers were Lieut. Col. Edward H. Marsh, Office of the Surgeon, Second Corps Area, U. S. Army, and Dr. Roger E. Heering, passed assistant surgeon, U. S. Public Health Service, district number 1.

Gold Medal Awarded to Physicist.—Edith H. Quimby, M.A. since 1932 associate physicist at the Memorial Hospital for the Treatment of Cancer and Allied Diseases, was presented with the gold medal of the Radiological Society of North America at its annual meeting in San Francisco in December in recognition of her work on dosage and filtration. Mrs. Quimby, at the annual meeting, presented a paper on "Practical Considerations Regarding the Employment of Various Qualities of Roentgen Rays in Therapy." Mrs. Quimby received her B.S. at Whitman College, Walla Walla, Wash., in 1912 and A.M. at California in 1915. She went to Memorial Hospital in 1932.

Conferences on Health Education.—Dr. John B. Youmans, Nashville, Tenn., gave the first lecture in a series of conferences on the scientific foundation of health education, January 30, on "Nutrition and Health Education." Others in the series are:

Dr. John Romano, Boston, Mental Hygiene, February 26.
Bernhard J. Stern, Ph.D., New York, Sociology, March 25.
Mr. Philip W. Lennen, president of Lennen & Mitchell, Instrumentalities of Education and Propaganda, April 30.
Dr. Perrin H. Long, Baltimore, Hygiene—Public Health, May 28.

The Welfare Council of New York City is sponsoring the lectures which are being given at the New York Academy of Medicine. Additional information may be obtained from Dr. Iago Galdston, 44 East Twenty-Third Street.

Conference on Tuberculosis.—The New York Tuberculosis and Health Association will hold its fortieth annual meeting at the Hotel Pennsylvania, March 2, following its annual conference on tuberculosis, which will be held jointly with the Tuberculosis Sanatorium Conference of Metropolitan New York. Speakers will include:

Dr. Bruce H. Douglas, Detroit, Tuberculosis and National Defense.
Dr. Charles J. Hatfield, Philadelphia, Tuberculosis—Retrospect and Prospect.
Dr. Edward S. McSweeny, Another Year of Tuberculosis Work.
Emil Frankel, Ph.D., director, division of statistics and research, New Jersey State Department of Institutions and Agencies, Trenton, N. J., Problem of Patients Leaving the Sanatorium Against the Advice of the Doctor.
Dr. Esmond R. Long, Philadelphia, Constitution and Tuberculosis.

The program will conclude with a panel discussion on "Problems in Pulmonary Tuberculosis," with Dr. Oswald R. Jones as moderator.

NORTH CAROLINA

Changes in Health Officers.—Dr. Edward S. Grady, Winston-Salem, has been placed in charge of the health unit in Johnston County, succeeding Dr. Will H. Lassiter Jr., Smithfield, resigned. Dr. Grady has been assistant health officer of the unit covering Forsyth, Stokes, Yadkin and Davie counties.

Society News.—The Union County Medical Society was recently addressed by Drs. Francis N. Andrews, Waxhaw, and John W. Ormand, Monroe, on "The Black Widow Spider" and "Clinical Medicine and Physiology" respectively.——At a joint meeting of the Mecklenburg County Medical Society and the North Carolina Radiological Society recently Dr. Ross Golden, New York, among others, spoke on "Diagnosis of Disease of the Small Bowel."

Personal.—Dr. Charles H. Pugh, Gastonia, was recently presented with a special scroll by chapter 66, Royal Arch Masons, in recognition of his many services in the order. Dr. Pugh, who is Grand High Priest, at one time served as secretary of the Gaston County Medical Society. He also served as president of the Seventh District Medical Society, of which he has been secretary for the last eleven years. He is also on the staff of the City Hospital and chief of staff of the Gaston County Negro Hospital of Gastonia, it is reported.

OKLAHOMA

New Two Year Program on Internal Medicine.—The state medical journal announces plans to begin a two year program of graduate lectures on internal medicine, with the financial assistance of the Commonwealth Fund of New York. A similar series on pediatrics was concluded in January with Dr. James G. Hughes, Oklahoma City, as the instructor. The Commonwealth Fund and the state department of health also cooperated in financing this course, which was arranged by the committee on postgraduate education of the state department of health. Nine circuits covered various teaching centers throughout the state; there were seven hundred and eighty-two enrolments, nine hundred and seventy-nine consultations and fifty lay lectures.

PENNSYLVANIA

Society News.—The Delaware County Medical Society meeting in Chester, February 12, was addressed by Dr. William Harvey Perkins, Philadelphia, on "Community Participation in Prevention."——At a meeting of the Centre County Medical Society in Bellefonte, February 12, Nollie B. Guerrant, Ph.D., State College, spoke on "The B Vitamins."

Philadelphia

Annual Thomas Oration.—Dr. Cornelius P. Rhoads, director, Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, gave the annual B. A. Thomas Oration before the Philadelphia Urological Society, January 26. His subject was "Genesis of Tumors."

First Aid Courses for Physicians.—The committee on national defense of the Philadelphia County Medical Society is sponsoring two courses in practical first aid. The first was given January 31, February 4 and February 7. Intended for physicians only, the courses consist of a demonstration of various first aid technics under the direction of Dr. Richard P. Shapiro.

Medical Genetics.—A series of lectures entitled "Our Ancestors, Ourselves, Our Descendants" opened at the College of Physicians under the auspices of the Woman's Medical College of Pennsylvania, January 23. Reginald Ruggles Gates, Ph.D., of the Marine Biological Laboratory, Woods Hole, Mass., gave the first talk. Laurence H. Snyder, Sc.D., professor of medical genetics, Ohio State University, Columbus, will speak, March 27, and Earnest A. Hooton, Ph.D., department of anthropology, Harvard University, April 24.

Memorial to Dr. Deaver.—The Lankenau Hospital is collecting material concerning the late Dr. John B. Deaver, emeritus professor of surgery at the University of Pennsylvania School of Medicine and professor of surgery at the graduate school, and for many years chief surgeon at the hospital, for a memorial collection in its library. Photographs, letters, memorabilia, reviews, press comments and articles by or about Dr. Deaver will be appreciated. Photostatic copies can be made of material available for loan only. Communications should be addressed to the Library Committee, the Lankenau Hospital.

WISCONSIN

Changes in Health Officers.—Dr. Kenneth F. PreFontaine, Slinger, has been appointed health officer for the village of Slinger; he occupies the same position for the village of Polk.——Dr. William H. Drissen, Port Washington, has been reappointed health officer of Ozaukee County.——Dr. George M. Shinners, has been appointed health commissioner of Green Bay.

First Hobby Show.—The first statewide physicians' hobby show will be presented in connection with the one hundred and first anniversary meeting of the State Medical Society of Wisconsin in Milwaukee, September 16-18. The subjects represented in the exhibit will be bells, books, clay modeling, coins, dishes, documents, etchings, firearms, floriculture, glassware and glass blowing, jewelry, manuscripts, match covers, metal spinning, metal working, model railroads, motion pictures, musical instruments, paintings, prescriptions, sculpture, sketches, soap carving, stamps, photographs, surgical instruments, swords and knives, taxidermy, weaving, wood carving and wood working.

Society News.—Dr. Samuel F. Haines, Rochester, Minn., addressed the La Crosse County Medical Society in La Crosse, January 15, on "Management of Thyroid Disease and Exophthalmia."——The Milwaukee County Medical Society meeting in Milwaukee, January 9, was addressed by Drs. Maurice A. Hardgrove, Milwaukee, on "Army and Navy Blood Plasma Bank" and William D. Stovall, Madison, "Laboratory Medicine in War."——Dr. Saul K. Pollack, Milwaukee, discussed "War Neuroses," January 22, at a meeting of the Outagamie County Medical Society in Appleton.——A meeting of the Walworth County Medical Society, at which members of the Woman's Auxiliary were guests, was held at Darien, January 8, as a farewell party for Dr. and Mrs. Lawrence H. Donath, Lake Geneva, who were leaving to make their home in Milwaukee.——Dr. Walter M. Kearns, clinical instructor in urology at Marquette University School of Medicine, Milwaukee, spoke on "Urinary Stone Formation in Recumbent Patients" before the Winnebago County Medical Society meeting, January 8, at Neenah.——The Milwaukee Neuro-Psychiatric Society was addressed, January 22, by Dr. John D. Camp, associate professor of radiology, University of Minnesota Graduate School, Rochester, Minn., on "Radiologic Diagnoses of Neuropsychiatric Disorders."

Trudeau Society Meeting.—The Wisconsin Trudeau Society met at Muirdale Sanatorium, Wauwatosa, January 17, for the following program:

Dr. James J. King, Milwaukee, Tuberculosis of the Genitourinary Tract in Its Relation to Collapse Therapy.
Dr. Ralph E. Campbell, Madison, Pelvic Tuberculosis (Experimental and Clinical).
Dr. William L. Coffey, Wauwatosa, Bronchospirometry.
Dr. David D. Feld, Wauwatosa, Presentation of Cases of Blastomycosis.

A symposium on a comparison of three methods of miniature x-ray films was presented by Drs. Llewellyn R. Cole and Harold M. Coon, Madison, and Einar R. Daniels, Milwaukee. In the evening, William H. Feldman, M.S., Rochester, Minn., discussed "Results of Certain Chemotherapeutic Agents in Experimental Tuberculosis," and Dr. Loren L. Collins, Ottawa, Ill., "The Advantage of Tuberculin Testing Surveys Over the X-Raying of Entire Groups Without First Tuberculin Testing."

GENERAL

Red Cross Appoints Assistant Director of Health Service.—Dr. Amos Christie, associate professor of pediatrics, University of California Medical School, San Francisco, has been appointed assistant director of medical and health service of the American Red Cross, with headquarters in Washington. Dr. Christie graduated at California in 1929. For a time he served as specialist in pediatrics with the U. S. Children's Bureau.

Campaign Opens for Immunization of Children.—President Roosevelt's proclamation designating May 1 as Child Health Day marked the start of a campaign to have all children in the United States immunized against smallpox and diphtheria before May 1. The campaign will be sponsored by the Conference of State and Provincial Health Authorities of North America and the Children's Bureau of the U. S. Department of Labor, with the cooperation of the U. S. Office of Education, U. S. Public Health Service, state and local health departments and the public schools throughout the country. The state and local health departments will be the agencies for arranging for the immunization of children.

Insulin Regulations Promulgated.—Watson B. Miller, Acting Federal Security Administrator, promulgated regulations on February 4 providing for the certification of drugs containing insulin. They became effective immediately, except for two provisions under the section on labeling. Control over insulin was given to the Food and Drug Administration by the amendment to the Federal Food, Drug and Cosmetic Act approved on Dec. 22, 1941. An informal hearing was held on December 30 to consider proposed regulations providing for the certification of drugs containing insulin, in accordance with the amendment. The final regulations are published in the *Federal Register* of February 6. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Winthrop Chemical Company Fined.—According to the New York *Times*, a fine of $15,800 was imposed, January 28, on the Winthrop Chemical Company by Federal Judge Simon H. Rifkind on the company's admission that it had shipped in interstate commerce an adulterated product improperly labeled as sulfathiazole tablets. The tablets were the subject of intensive police hunts here and in Chicago last spring, after it had been discovered that they contained a possibly harmful drug. The Winthrop company pleaded guilty to the charge of violating the Federal Food, Drug and Cosmetic Act, on which the fine was based. The tablets in question had been contaminated by phenobarbital, a sleep inducing drug which should be used on the advice of a physician, and then only in very small quantities. The government's allegations included charges that the drugs might have been harmful if used in accordance with instructions on the labels of their containers.

Annual Prize for Essay.—The Mississippi Valley Medical Society offers annually a cash prize of $100, a gold medal and a certificate of award for the best unpublished essay on any subject of general medical interest, including medical economics, and practical value to the general practitioner of medicine. Certificates of merit may also be granted to the physicians whose essays are rated second and third best. Contestants must be members of the American Medical Association who are residents of the United States. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society at Quincy, Ill., September 30-October 2. The paper shall not exceed five thousand words, must be typewritten in English in manuscript form, must be submitted in five copies and must be received not later than May 1. Dr. Harold Swanberg, 209-224 W. C. U. Building, Quincy, Ill., is secretary of the society.

Central Surgical Association.—The second annual assembly of the Central Surgical Association will be held in Chicago, February 27-28, with headquarters at the Drake Hotel. Sessions will be held at the Presbyterian Hospital and the Illinois Research and Educational Hospital. Among the speakers will be:

Drs. Brock E. Brush and Conrad R. Lam, Detroit, Effect of Topical Application of Several Substances on the Healing of Cutaneous Wounds: Experimental Study.

Dr. George Gavin Miller, Montreal, Two Hundred and Thirty Cases of Gastric Resection for Peptic Ulcer.

Dr. George E. Wilson, Toronto, Management of the Duodenum in Gastric Resection.

Dr. August F. Jonas Jr., Omaha, Post-Traumatic Strictures of the Intestine.

Dr. Bernard B. Larsen, Cleveland, A Method for the Insertion of the Smith-Petersen Nail Without an Initial Skin Incision.

Dr. Vinton E. Siler, Cincinnati, Acute Costal Chondritis Associated with Sternal Osteomyelitis.

Dr. Alfred W. Farmer, Toronto, Hypospadias.

Dr. John Harold Couch, Toronto, Bilateral, Preganglionic Sympathectomy for Raynaud's Disease with Gangrene of the Fingers.

Dr. William S. Keith, Toronto, Empyema of the Spinal Epidural Space.

Report of National Paralysis Foundation. — According to the third annual report of the National Foundation for Infantile Paralysis, more than $805,000 was expended in seventy-two grants and appropriations during the year ended Sept. 30, 1941 to carry on research activities. Of this sum more than $194,000 went to virus research in different medical schools, state health departments and institutions throughout the United States and Canada. Almost $70,000 was used for nutritional research and $84,000 for research for the prevention and treatment of after-effects of poliomyelitis. A large sum was expended in educational grants and in expenses covering epidemics and public health. Since 1934, when the celebrations for President Roosevelt's birthdays were inaugurated, more than $9,000,000 has been collected in the various affairs held throughout the country to observe the occasion. Of this total more than $4,000,000 has been left in communities, $1,467,392.21 has been given to Georgia Warm Springs Foundation, $241,000 has been given to the President's Research Commission, and more than $3,000,000 has been given to the National Foundation since its organization in 1938. The work in the local field is conducted through more than two thousand chapters covering more than two thousand five hundred counties in the United States. The educational program of the foundation has been conducted on two fronts: first, grants have been made to agencies providing continued education to certain professional workers and, second, the foundation itself has engaged in direct education of professional groups and the lay public. In its consideration of the after-effects of infantile paralysis the foundation endorsed the treatment used by Miss Elizabeth Kenny, an Australian nurse, which, in the acute stage, includes the abandonment of splints and immobilization.

LATIN AMERICA

Pediatric Prize Awarded. — Dr. Juan P. Garrahán, a pediatrician of Buenos Aires, was awarded the 1941 prize of the Academia Nacional de Medicina of Buenos Aires for his article on "Prothrombin, Vitamin K and Hemorrhages in Newborn Infants." The prize was established by the Academia in memory of the Argentine pediatrician Dr. Juan Carlos Navarro, who died in 1936. It was awarded every three years to the author of the best article on pediatrics submitted in competition to the Academia. Drs. G. F. Thomas and Alfredo Larguía, also of Buenos Aires and collaborators of Dr. Garrahán, won honorable mention.

Meetings on Ophthalmology.—The fifth Brazilian Congress of Ophthalmology will be held in Bahia, under the auspices of the Society of Ophthalmology of Brazil, in order that members may attend the Pan American Congress of Ophthalmology to be held in Montevideo in November 1943. Dr. Harry S. Gradle, president of the Pan American Congress, met with officials of the Brazilian congress at the session in June 1941 to appoint the following committees to carry on the work of the Pan American Congress: international committee for the prevention of blindness, an international committee for trachoma and a committee for the interchange of ophthalmologic literature and one for cultural relations.——The Mexican Society of Ophthalmology, founded in 1893, will hold its next meeting Dec. 2, 1943. According to the *American Journal of Ophthalmology* the following program will be presented: Drs. Ernesto Olmos S., Mexico, D. F., will speak on "Evolution of the Sclerocorneal Suture and Intracapsular Extraction in Cataract Operation," and Manuel de Rivas Cherif, Mexico, D. F., "Insomnia of Ocular Origin."

FOREIGN

Polish Graduates at Edinburgh.—The first exercises in which students of the Polish School of Medicine received their degrees at Edinburgh University were held on Dec. 12, 1941, according to the *Lancet*. Sir Thomas Holland, vice chancellor, presided, and the degrees were conferred with the authority of the Polish government by Prof. A. T. Jurasz, dean of the Polish faculty of medicine. Four students received their degrees, one student from Warsaw, and three from Cracow.

Awards in Science. — The Royal Society of London has awarded the Copley Medal to Sir Thomas Lewis for experimental researches in clinic and laboratory on the heart and circulation and their disorders. The Davy Medal has been given to Henry D. Dakin, Ph.D., for pioneer work in biochemical research and his contribution to the study of intermediate metabolism. A medal has been awarded to Dr. Ernest Laurence Kennaway for his investigations on the production of cancer by synthetic substances. Dr. Kennaway is professor of experimental pathology at the University of London and director of the Chester Beatty Research Institute of the Royal Cancer Hospital, London.

Government Services

Federal Security Administrator Designates Habit Forming Drugs

Federal Security Administrator Paul V. McNutt has announced that he has issued an order promulgating a regulation under section 502(d) of the Federal Food, Drug and Cosmetic Act to become effective April 23. This regulation designates the chemical derivatives of the substances named in section 502(d) which are habit forming. It is based on the evidence presented to the public hearing held for that purpose in March 1941. The regulation is published in the *Federal Register* of January 23. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Hospitals Urged to Make Own Building Plans

Hospitals should go just as far as they can in arranging their own financing programs without waiting for hoped for aid from Defense Public Works grants or loans, according to a release from the Federal Works Agency. The statement was made by way of warning to a large number of hospitals which are said to be delaying fund raising or other financial programs for expansion of facilities while they await decisions on applications to the Federal Works Agency. In addition to the hospital projects which have already been approved, applications have been filed for additional hospital projects, the total estimated cost of which is more than $155,000,000. Under the new Lanham Act appropriation only $150,000,000 was made available for Defense Public Works of all types. The release pointed out that a number of these hospitals are not eligible under the act by reason of the fact that their need for expansion is not based on the defense program. It is obvious that the government will not be able to meet the entire need, and hospitals are urged to arrange in advance of their applications their own share of the financing that will be necessary. Where the beds are needed in the defense program, they must be provided as quickly as possible. Delay on the part of the hospitals in raising their part of the necessary funds will make it difficult for the government to assist them.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 3, 1942.

The Medical Supervision of Industrial Workers

A special committee was appointed by the council of the British Medical Association to make recommendations for the better coordination of industrial medical practice with the existing medical system, particularly with general practice and the public health and hospital services. It has presented by deputation an important report to the minister of labor and national service. The starting point of the committee is the view, taken by the council of the British Medical Association, that the time is ripe for an extension of industrial medical service, that more emphasis should be laid on the preventive aspects of industrial medicine, that there should be a closer association between the medical profession and industry, and that the part played by industrial factors in the causation of disease should be more fully appreciated by physicians and employers.

Industry loses through the ill health of workers thirty-one million five hundred thousand weeks' work yearly. The environmental conditions during the working day must account for a large share of this. The loss from accidents in terms of money is estimated at over $150,000,000 yearly. Accidents of course occur to the healthiest, but much time might be saved through adequate arrangements for medical supervision. One firm reports disappearance of its special hazard—lead poisoning—as a result of medical care. Firms with an average yearly loss through illness of ten days for men and twelve and one-half days for women found that rendering medical service available reduced the loss by from three and seventy-five one hundredths to five and twenty-five one hundredths days for men and four and five-tenths to seven and nine-tenths days for women. Medical supervision means not merely nursing, welfare, first aid and accident prevention or even the retention of a local physician on call for emergency. It means continuous supervision of the health of the individual worker in his industrial environment, the prevention as far as possible of physical and mental illness, a service for the initial treatment of injury, and efficient liaison between the factory and the external medical services.

A physician accepting a post in industry, whether part or whole time, should have some knowledge of industrial organization and factory methods. His duties should include (1) medical inspection of employees during working hours, (2) supervision of general working conditions, (3) organization and supervision of accident service, including rehabilitation and (4) study of specific occupational hazards and their prevention.

Only such treatment as is necessary during working hours should be undertaken in the factory, excepting industrial diseases which the medical officer is specially qualified to treat. Any further treatment should be undertaken by the patient's own physician or by the hospital to which he is referred. The need for good working relations between the general practitioner and the industrial medical officer is repeatedly stressed. Such contact as at present exists is far too limited.

Extension of the Age for Military Service and Conscription of Women

The age of compulsory military service for men has been raised from 41 to 51 years. But men called up over 41 will not be posted for the more active military duties. No one will be asked to do tasks for which he is physically unfitted. The age for military service is also to be lowered to 18½ years, and boys and girls between the ages of 16 and 18 are to be registered.

Women are now conscripted for services auxiliary to the fighting forces, but no woman is required to use a lethal weapon. The government already has power to direct married women into industry. The new power of conscription will be applied in the first instance to unmarried women between the ages of 20 and 30. In the great field of married women doing necessary household work, comprising about eleven million, the government see the largest reserves for industry and home defense in the future. The part time employment of women in industry has already been developed, but on nothing like the possible scale. A great variety of arrangements are possible to enable women to divide up domestic tasks and be free to work close at hand in the factory or field. Thus five or more might arrange for each to cook a day in turn, or the development of crèches and public nurseries might free or partially free mothers from domestic duties. Women physicians will serve on medical boards to take care of the women called up.

Foreign Physicians in Britain

The large number of refugee foreign physicians in this country presents the medical authorities with a problem. Many are engaged in the service of their national armies training on British soil. Others engage in practice among the British. At the opening session of the General Medical Council (the disciplinary body for the medical profession) the president, Mr. H. L. Eason, said that the council admitted foreign physicians temporarily to the Medical Register but had been put to some difficulty by the wording of the defense regulation which allowed them to do this. A physician was barred from making an effective application unless he could show that he was by law entitled to practice in some country to which the regulation had been applied. But the right to practice had been withheld as part of the persecution on the continent. A new regulation now relieved an applicant of the obligation to show a title to practice if, alternatively, he held a medical diploma or had passed examinations qualifying for such diploma. The new regulation also allows temporarily registered foreign physicians to serve as assistants to British physicians.

Czech Examinations in London

The historic role of Britain as a refuge from persecution, political or religious, on the European continent is once more in evidence in the worst persecution that Europe has known. Not only have the refugees been welcomed but everything possible has been done for them. The hospitality of the University of Edinburgh for the Polish Medical School established within its portals has been previously described in THE JOURNAL. Some Czechs attend this school; they have none of their own in this country. However, at the request of the Czech minister of the interior and education in London, the examining board of the Royal College of Surgeons, England, has undertaken to conduct a special final examination (second and third rigorosa) for the Czechoslovak M.U.Dr. degrees. Part I (pathology and bacteriology) has been held in London, at which twelve candidates were examined, of whom eight passed.

Milk Rationing

Though the demand for liquid milk is higher than before the war, the supply in spite of every effort is lower. The Ministry of Food is using its war power of control to direct supplies to those who most need them. The ration of the ordinary citizen has been reduced to 2 pints weekly, while the first claim is given to mothers, children and adolescents. On the advice of the Special Diets Advisory Committee, the Medical Research Council and the British Medical Association arrangements have been made whereby physicians may prescribe quantities up to 2 pints daily, but they are asked not to prescribe the maximum in every case, because of the shortage. A priority claim up to a maximum of 2 pints daily is allowed in active tuberculosis, silicosis, diseases of the mouth, throat or gullet which interfere with swallowing, gastric and duodenal ulcer, prolonged fever and postoperative conditions after major operations. A priority claim up to 1 pint daily is allowed for active workers during an

incapacitating illness, sick children not attending school, dyspepsia due to conditions other than ulcer, colitis, diabetes, thyrotoxicosis and nephritis.

How the London Hospital Carries On

The extensive damage to the largest hospital in the metropolis, the London Hospital, by German bombs has been described in previous letters. The number of beds in use has been reduced to three hundred and fifty, less than half of the normal, but by means of branches opened in safer districts just outside London the hospital is doing more work than ever. The annex at Brentwood has three hundred and sixty beds and there have also been opened in the country two maternity homes and a hostel for expectant mothers. The hospital also maintains in London a first aid post and a mobile unit.

SWITZERLAND

(From Our Regular Correspondent)

Nov. 25, 1941.

Tuberculosis Mortality in Switzerland

The official figures on tuberculosis mortality in Switzerland give the picture portrayed in the accompanying table. In spite of the unfavorable general conditions that prevailed in Switzerland during 1940 there was a decrease in the mortality from pulmonary tuberculosis, but in the other forms of tuberculosis a slight increase was evident. However, on account of the summary statistical evaluation, the latter is of no particular significance. It has been determined by the president of the

Tuberculosis Mortality in Switzerland

	Pulmonary Tuberculosis		Other Forms of Tuberculosis		All Forms of Tuberculosis	
Year	Absolute	For 10,000 Inhabitants	Absolute	For 10,000 Inhabitants	Absolute	For 10,000 Inhabitants
1940	2,445	5.8	848	2.0	3,303	7.8
1939	2,569	6.1	802	1.9	3,371	8.0
1938	2,616	6.2	834	2.0	3,450	8.2
1937	2,770	6.6	857	2.1	3,627	8.7
1936	3,052	7.3	889	2.2	3,941	9.5

Swiss organization against tuberculosis, Dr. E. Bachmann, that the tuberculosis mortality of Switzerland is extraordinarily low. He proves that the numerous theories about connections between tuberculosis mortality and social milieu do not have the significance that was formerly ascribed to them. Furthermore, Dr. Bachmann emphasizes that the better therapeutic possibilities and the efforts of the antituberculosis organizations for the early diagnosis is to a high degree responsible for this decrease. These determinations are the more important since recent investigations in the pathologic anatomic institute of the university of Zurich have demonstrated that the permeation of the population with tuberculosis is about the same as forty years ago, although it has shifted into higher age groups.

Swiss Society for Psychiatry

At the 1941 meeting of the Schweizerische Gesellschaft für Psychiatrie, various reports of general interest were made. A. Repond of Lausanne directed attention to the scientific and practical problems presented by abnormal persons, which, thanks to the good organization in Switzerland, have found a better solution here than in many other countries. At any rate the training of special personnel in psychotherapy and psychoanalysis must be extended in order to relieve the psychiatrists.

Dr. H. Hanselmann of Zürich pointed out that psychiatric policlinics for children must be increased in number, that school physicians must have a better psychiatric training and that the fight against charlatanism in this sphere must be carried out with greater energy than heretofore in order to exclude those who claim to be qualified but are not. Finally he emphasized the increasing need of the collaboration of psychiatrists in the estimation of psychopaths in prisons, in the care for difficult children in institutions and for the inmates of the houses of correction.

Dr. Bersot read a paper on the development of the care of abnormal persons in Switzerland. In 1880 there were sixty-seven institutions with 2,050 inmates, whereas today there are two hundred and forty-four with 12,541 inmates. Whereas in 1888 there were only two school classes for the abnormal, there are now two hundred and sixty with 4,761 pupils. The total number of abnormal persons in all of Switzerland is about 200,000. Dr. Repond established that of 69 children of the canton of Waadt who had committed minor thefts, only 12 were psychically normal. In numerous asocial children, Repond has been able to cure by psychologic treatment not only the defects due to wrong training or to the influences of bad environment but also the underlying disorder. However, this treatment is not given in institutions but through an organization of medicopedagogic welfare work; the child remains in the family, and frequently not only the child but the entire family is influenced and treated.

Prof. Dr. W. Boven of Lausanne has made detailed investigations on suicide and its causes. In the last forty years suicide has increased but little in Switzerland, that is from 0.022 per cent to 0.024 per cent. He concludes that in the families of persons with mental disease suicide is ten times as frequent as in other families; 30 per cent of the male suicides and 50 per cent of the female suicides are mental defectives. Boven computes how many people of Switzerland are exposed to suicide on the basis of a psychosis or of a schizoid or cyclothymic disposition; on this basis there are about 86,000 persons among whom there are only seven hundred and fifty suicides (0.73 per cent). This small proportion he ascribes to educational and protective measures and to mental hygiene measures. Prof. H. W. Maier, head of the department of psychiatry in Zürich, calls attention to the difficulties encountered in this respect in statistics on suicides, the more so since the true cause is often kept secret.

At the suggestion of the president of the Swiss department of health, Prof. H. Steck of Lausanne, an inquiry has been made among Swiss psychiatrists about the dangers of public demonstrations of hypnotism and suggestion. Some of the answers indicate that harmful effects have been produced by these demonstrations.

Psychology of the Aged

The psychology of the aged was discussed in the Medizinische Gesellschaft of Basel by Dr. A. L. Vischer of the university clinic for internal medicine, who directs attention to the difficulties encountered in research on the process of aging. One of the difficulties is that involution does not follow such clear and uniform laws as does growth; another one is that aging is often accompanied by pathologic processes. Experimental psychology has furnished few new contributions in explanation of the process of aging. Vischer thinks that this is due to the fact that insufficient attention was given to the course of earlier life. It has been justly pointed out that in the further explanation of these problems intellectual analyses are fertile in the explanation of mental conditions. A first attempt in this direction is Brinkmann's analysis of the late works of art of the great masters. An important phenomenon of the aging process to which little attention has been given heretofore is the changed evaluation of time. The consciousness of the future plays an important part in all these problems. When this consciousness of the future disappears and compensation is lacking, the formative power of time, which may be called the frame of life, breaks down. In the ruins of

this breakdown of the formative power of time there remain as only remnants of the framework of time the banal division into the parts of the day and the animal functions. Such decay in the formative power of time can appear also in young persons under artificially produced external conditions. Vischer observed such phenomena on war prisoners, whose mental observations he described previously under the term "barbed wire disease."

Infectious Diseases in Switzerland

According to reports received by the Swiss Bureau of Health, scarlet fever has increased since 1937. It occurred chiefly in endemic form but was of benign character. Diphtheria has decreased since 1937. There were 772 cases in 1937, 716 in 1938, 751 in 1939 and 663 in 1940; the fatalities for the years 1937 to 1939 inclusive were 37, 50 and 33, respectively.

The incidence of abdominal typhoid is low in Switzerland. This indicates favorable hygienic conditions, of importance on account of the military service.

Infantile paralysis decreased from 521 cases in 1939 to 237 in 1940. This disease was chiefly of sporadic character; it appeared mostly in those rural regions which had escaped during the epidemics of 1936 and 1937. It was in Switzerland that the potassium chlorate treatment of poliomyelitis was suggested several years ago. At first the treatment seemed to produce good results, but subsequent investigations did not corroborate the initial successes.

The number of cases of cerebrospinal meningitis continued to rise during 1940. In all, 710 cases were reported. This high number, which applies only to the civil population, had never before been reached in Switzerland. The highest numbers so far had been 102 in 1915 and 109 in 1916. Yet the disease did not have a truly epidemic character but seemed to manifest itself mostly in local accumulations of sporadic cases, which were distributed over nearly the entire country. However, the high mortality which prevailed formerly has decreased greatly since serotherapy has been supplemented, if not replaced, by the sulfonamides.

Bang's disease (Brucella abortus infection) has decreased from 157 cases in 1937 to 120 cases in 1940.

BUENOS AIRES

(From Our Regular Correspondent)

Jan. 11, 1942.

Bronchocinematography

Drs. Mariano R. Castex, Egidio S. Mazzei and Manuel Malenchini succeeded in carrying on cinematography of the bronchial tree in normal and pathologic conditions. The work was done in the Instituto de Investigaciones aplicadas a la Patología Humana, which is a department of the National School of Medicine of Buenos Aires, under the direction of Prof. Mariano R. Castex. The technic used was that which has been previously reported by Manoel de Abreu of Brazil in which the films are obtained after injecting iodized oil in the bronchial tree. This is the first time that bronchocinematography has been attempted in Buenos Aires. The accurate and detailed dynamics of the bronchial tree during the different phases of respiration can be interpreted by the films, which are obtainable at a rate, per second, of from 8 to 16 for each respiratory cycle. The bronchocinematographic results confirm observations previously reported by Castex, who found that there are two different types of bronchial movements, passive and active. The former are movements of pulsation, which is transmitted to the bronchi from the heart, aorta and pulmonary artery and also from the esophagus during deglutition. The latter are movements which occur when the bronchi change in size and caliber and during peristalsis and torsion. Films of normal bronchi exhibit bronchial movements (1) of elongation in a given direction, (2) of expansion from increase of the bronchial caliber, (3) of dispersion or radial amplification of movements and (4) of internal inspiratory torsion at the lower lobules. Films of patients with bronchial diseases exhibit abnormal movements, especially those given by the changes of caliber of the bronchi during elongation of the structure. The caliber of the bronchi increases moderately (or does not increase at all) in patients with chronic bronchial diseases. It diminishes in bronchial asthma and in bronchiectasis. In bronchial asthma the cinematographic figure is of difficult interpretation. It exhibits changes from forced respiration and from hypertonicity of the system of elastic muscular fibers of the bronchopulmonary structures. In bronchial asthma and in some cases of bronchiectasia the bronchocinematographic figure is inverted during inspiration. It shows diminution of the bronchial caliber during elongation of the bronchi from inspiration.

Congress on Population Problems

The first congress of problems of population was held in Buenos Aires some time ago. The members of the Museo Social Argentino, who were also members of the organizing committee of the congress, made a compilation of the articles presented and they prepared a book with four hundred and seventy pages which was recently published. The government is taking note of the concentration in the large cities of the country. Some years ago the urban population was 35 per cent and the rural population 65 per cent. In 1938 the urban population was 74 per cent and the rural population 26 per cent. The congress recommended (1) official loans to couples (especially rural couples) who want to get married, (2) help to parents of large families as well as to couples with young children and (3) education of the public in problems of sex and hygiene in order to increase the birth rate. Dispensaries for pregnant women and health centers for mothers and their children should be established all through the country. Obstetricians should give obstetric and medical care gratis to delicate mothers during labor as well as to women in premature or abnormal labor. Children should be protected against food insufficiency. Pregnant working women and working mothers of young infants should be helped to protect them against occupational diseases and their complications. A department of social workers should be organized to work in remote regions of the country. A special branch of the national department for recording births should be established, in which only cases of mortinatality should be recorded. This special record aims to diminish abortion and feticide, which are the most frequent factors in lowering the coefficient of natality. Teaching of preventive medicine should be regarded as of special importance in the universities with the aim of preventing disease, invalidism and premature death of students. It is advisable to construct hospitals for patients with chronic diseases in the open country or in the mountains and to establish agricultural and other types of work in rural zones around the hospitals for increasing the population in those regions.

Marriages

AUGUSTUS MCCRAVEY, Chattanooga, Tenn., to Miss Helen M. Welles of Cummington, Mass., at Fort Bragg, N. C., Nov. 15, 1941.

GEORGE FRANCIS BUSBY, Salisbury, N. C., to Miss Dorothy Rudy at St. Petersburg, Fla., in December 1941.

SAMUEL ETINGE ELMORE JR., Spindale, N. C., to Miss May Carroll Miles in New Orleans in December 1941.

HAROLD BARKER KERNODLE, Elon College, N. C., to Miss Ernestine Robertson at Durham, Dec. 19, 1941.

WILLIAM RULE III to Miss Effie Hampton Crane, both of Lubondai, Belgian Congo, Africa, recently.

BENJAMIN F. STREETS, Sutersville, Pa., to Miss Louise Rowe at Pittsburgh, Dec. 14, 1941.

Deaths

Samuel Waldron Lambert, New York, dean emeritus at Columbia University College of Physicians and Surgeons, died, February 9, at his home of heart disease, aged 82. Dr. Lambert was born in New York, June 18, 1859. He graduated at Yale University, New Haven, Conn., and in 1885 at the College of Physicians and Surgeons, then the medical department of Columbia University. He was attending physician on the staffs of the Nursery and Child's Hospital, 1890-1896, New York Lying-In Hospital, 1890-1905, New York Hospital, 1896-1909, St. Luke's Hospital, 1906-1929, a trustee of the Roosevelt Hospital from 1904 to 1919 and a consultant to many hospitals in the metropolitan area. He was professor of clinical medicine at Columbia from 1903 until 1919 and dean from 1904 to 1919 and was president of the New York Academy of Medicine from 1926 through 1928. Dr. Lambert was a member of the Medical Society of the State of New York, the Association of American Physicians and the American Gastro-Enterological Association. He was the author of "Medical Leaders: From Hippocrates to Osler," with G. M. Goodwin as co-author, of "When Mr. Pickwick Went Fishing" and of numerous papers in the periodical literature. The growth and development of the present Medical Center at Columbia University is attributed largely to Dr. Lambert.

John Joseph McLoone, Santa Monica, Calif.; George Washington University School of Medicine, Washington, D. C., 1910; member of the House of Delegates of the American Medical Association in 1916; member of the Pacific Coast Oto-Ophthalmological Society; fellow of the American College of Surgeons; formerly attending ophthalmologist and otologist, St. Joseph's Hospital, Phoenix, Ariz.; aged 61; died, Dec. 26, 1941.

Oscar P. Honegger, Lake Mahopac, N. Y.; Universität Heidelberg Medizinische Fakultät, Baden, Germany, 1879; member of the Medical Society of the State of New York; aged 86; died, Dec. 25, 1941, in East Portchester, Conn., of fracture of the left hip and bronchopneumonia.

Charles David Ripley, Point Pleasant, N. J.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1889; member of the Medical Society of New Jersey; aged 77; died, Dec. 25, 1941, in East Orange of coronary thrombosis.

Herman S. Pepoon, Chicago; Hahnemann Medical College and Hospital, Chicago, 1883; for many years a teacher of botany at the Lake View High School; aged 81; died, Dec. 26, 1941, in the Augustana Hospital of carcinoma of the prostate.

Samuel William Green ✠ Brooklyn; Albany (N. Y.) Medical College, 1917; served during the World War; on the staff of the Jewish Hospital from 1922 to 1941; aged 47; died, Dec. 26, 1941, of chronic nephritis and hypertension.

Carroll C. Strickland, Detroit; Meharry Medical College, Nashville, Tenn., 1908; member of the Michigan State Medical Society; on the staff of the Parkside Hospital; aged 59; died, Dec. 26, 1941, of malignant hypertension.

John P. Brown, Fairmont, N. C.; University of Maryland School of Medicine, Baltimore, 1883; member of the Medical Society of the State of North Carolina; for many years mayor; aged 77; died, Dec. 7, 1941, of uremia.

William McMullen Garretson, East Petersburg, Pa.; Jefferson Medical College of Philadelphia, 1903; member of the Medical Society of the State of Pennsylvania; aged 61; died, Dec. 28, 1941, of cerebral hemorrhage.

William White ✠ El Paso, Texas; Kentucky School of Medicine, Louisville, 1891; University of Pennsylvania Medical Department, Philadelphia, 1892; aged 77; died, Dec. 13, 1941, of a skull fracture received in a fall.

William Earle Grady, Tryon, N. C.; University of Maryland School of Medicine, Baltimore, 1894; member of the Medical Society of the State of North Carolina; aged 70; died, Dec. 9, 1941, of coronary thrombosis.

James Michael Popp ✠ New Castle, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1897; aged 78; on the staff of the New Castle Hospital, where he died, Nov. 28, 1941, of strangulated left inguinal hernia.

Eldridge H. Campbell, Alderson, W. Va.; College of Physicians and Surgeons, Baltimore, 1894; member of the West Virginia State Medical Association; aged 73; was found dead, Dec. 21, 1941, of coronary thrombosis.

Terence Bernard O'Neil, Ilion, N. Y.; Baltimore Medical College, 1901; member of the Medical Society of the State of New York; on the staff of the Ilion Hospital; aged 66; died, Dec. 7, 1941, of heart disease.

John Peter Byrnes, Springfield, Mass.; Albany (N. Y.) Medical College, 1914; fellow of the American College of Surgeons; served during the World War; aged 50; died, Dec. 30, 1941, of cerebral hemorrhage.

Frederick James Pate ✠ Greensboro, N. C., University of Maryland School of Medicine, Baltimore, 1908; served during the World War; aged 56; died, Dec. 14, 1941, in St. Leo's Hospital of carcinomatosis.

Benjamin Mikelsky Mikels ✠ Long Beach, Calif.; Medical School of Maine, Portland, 1914; aged 59; on the staff of the Seaside Memorial Hospital, where he died, Dec. 19, 1941, of hypertensive heart disease.

Herbert Lee Garland, Logansport, La.; Louisville (Ky.) Medical College, 1906; member of the Louisiana State Medical Society; aged 61; died, Dec. 20, 1941, in a hospital at Shreveport of heart disease.

George Washington McSweeney, New York; Fordham University School of Medicine, New York, 1911; served during the World War; aged 52; died, Dec. 25, 1941, in the Veterans Administration Facility.

Emrys Richards, Wilkes-Barre, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1900; aged 67; died, Dec. 24, 1941, in the Mercy Hospital of carcinoma of the liver and stomach.

William Edward Wills, Corpus Christi, Texas; Memphis (Tenn.) Hospital Medical College, 1904; health officer from April 1919 to April 1925; aged 67; died, Dec. 16, 1941, of cerebral hemorrhage.

William Osenbach, Orlando, Fla.; Central College of Physicians and Surgeons, Indianapolis, 1896; aged 73; died, Dec. 11, 1941, of acute pyelonephritis, uremia and carcinoma of the penis.

Thomas Adolphus Michie, Steele, Mo.; Memphis (Tenn.) Hospital Medical College, 1895; aged 71; died, Dec. 16, 1941, in the Methodist Hospital, Memphis, Tenn., of coronary thrombosis.

George Ramson Wilkins, Cleveland; Cleveland Homeopathic Medical College, 1899; served during the World War; aged 71; died, Dec. 12, 1941, of coronary occlusion and arteriosclerosis.

Joseph Edwin Showalter, Waterloo, Ind.; University of Wooster Medical Department, Cleveland, 1893; formerly member of the local board of education; aged 78; died, Dec. 1, 1941.

Frank Hulburt Booth, Chicago; Rush Medical College, Chicago, 1885; aged 81; died, Dec. 6, 1941, in the Research and Educational Hospital of carcinoma of the bladder.

Clifford Kuykendall Logan ✠ Hominy, Okla.; University of Oklahoma School of Medicine, Oklahoma City, 1920; aged 46; died, Nov. 14, 1941, of carcinoma of the pharynx.

Edwin Percy Moore, South Bend, Ind.; University of Pennsylvania Department of Medicine, Philadelphia, 1893; aged 71; died, Dec. 22, 1941, in the Epworth Hospital.

John Herman Mills ✠ Tampa, Fla.; Jefferson Medical College of Philadelphia, 1895; owner of a hospital bearing his name; aged 70; died, Dec. 21, 1941, of pneumonia.

Myles William O'Reilly, Newark, N. J.; Queen's University Faculty of Medicine, Belfast, Ireland, 1880; died, Dec. 19, 1941, in Maplewood of arteriosclerosis.

Wilbur Henson Hale, Narrows, Va.; Medical College of Virginia, Richmond, 1928; aged 39; died, Dec. 25, 1941, in a hospital at Lexington, Ky., of pneumonia.

William Samuel Moore, Heath Springs, S. C.; University of the City of New York Medical Department, New York, 1890; aged 78; died, Dec. 2, 1941.

Hiram Otto Green, Spencer, Iowa; St. Louis College of Physicians and Surgeons, 1895; aged 71; died, Dec. 14, 1941, of coronary sclerosis.

Robert Augustus Holcomb, Hickory Flat, Miss. (licensed in Mississippi in 1900); aged 64; died, Dec. 4, 1941, of pulmonary tuberculosis.

Charles A. Teeters, Washington C. H., Ohio; College of Physicians and Surgeons, Baltimore, 1888; aged 83; died, Dec. 27, 1941, of senility.

Correspondence

PROTEUS VULGARIS AS GAS PRODUCER IN DIABETES

To the Editor:—In THE JOURNAL, Dec. 27, 1941 Carl L. Gillies reported 4 cases of interstitial emphysema in diabetes caused by the colon bacillus. It seems worth while at this time to call attention to the fact that Proteus vulgaris may also be a producer of gas in cases of diabetes.

In August 1939, in Joseph Tenopyr's service at Kings County Hospital, Brooklyn, I attended a young diabetic Negress who had a painful, large, hard, cracked callosity on the heel. While she was in the hospital an area of cellulitis adjacent to the callus appeared, associated with a decided elevation of the pulse rate and of the temperature. A dirty brownish serous discharge with a "musty" odor oozed from the crack, and a few days later an area of crepitation in the tissues surrounding the heel was noted, which soon spread to involve similarly the entire lower extremity. Roentgen studies confirmed the presence of interstitial emphysema. Repeated cultures of material taken from the wound were negative for anaerobic gas bacilli but all were positive for P. vulgaris, which was at first regarded as a contaminant. Despite therapy with large doses of sulfanilamide and anti-gas gangrene serum, blood transfusions, intravenous fluids and other supportive measures, the patient ran the course of a severe septicemia and died in a few days. Postmortem cultures taken from the affected limb and from the heart's blood were positive for P. vulgaris.

A perusal of the literature at that time showed that others had noted that P. vulgaris may be a producer of gas in cases of diabetes.

This organism should be considered also in the differential diagnosis of gas gangrene in cases of diabetes.

HAROLD L. LEDER, M.D.,
U. S. Veterans' Administration Facility,
Columbia, S. C.

METRAZOL SHOCK TREATMENT

To the Editor:—In the discussion of the paper by Dr. Erich Liebert entitled "Spontaneous Convulsions Following Metrazol Treatment" (THE JOURNAL, January 10, p. 119), Dr. Roy R. Grinker of Chicago makes the following statement:

> At one time I indicated that, with metrazol, psychiatrists hardly waited for the patient to take his clothes off before he was shocked, and now we learn from Dr. Myerson that it is not necessary to hospitalize a patient, that one can shock him in one's office, keep him there for an hour or two and then return him home. This I consider extremely dangerous, since before long such easily applied therapy will be appropriated by the inexpert and used promiscuously and indiscriminately.

Dr. Grinker is entirely mistaken when he states that I have advocated the use of shock treatment of any kind in an office, and I do not know what grounds he has for making any statement to the effect that I regard this treatment as casual or of the office type. While I have given considerable electric shock treatment, none of it has been done in my office, and all of it has been done in a hospital. I have stated that it is not necessary to hospitalize the patient; that after a wait of one to two hours the patient may return home, but this is by no means equivalent to casual or office treatment. I am strongly against the use of either metrazol or electric shock therapy in any office, and there is nothing in any of my writings which indicates that such treatment is regarded by me as something to be carried out in any hit or miss fashion.

ABRAHAM MYERSON, M.D., Boston.

TREATMENT OF PEPTIC ULCER

To the Editor:—The article by Drs. Dick and Eisele on peptic ulcer (THE JOURNAL, January 3, p. 38) was read by me with great interest, chiefly because the mode of treatment promulgated by the authors was at variance with the more generally accepted therapy for this condition. Without analyzing the contents of the article or entering into the controversy which it will no doubt provoke, locally or generally, I wonder why the authors with their emphasis on the use of cream in the treatment of peptic ulcer did not indicate in at least one sentence the physiologic rationale of the use of that substance, in that its ingestion leads to the liberation of enterogastrone, a chalone, which inhibits not only gastric motility but also the formation (secretion) of gastric juice with its hydrochloric acid content, as shown by Drs. Ivy and Lim several years ago.

ARNO B. LUCKHARDT, M.D., Chicago.

NOTE.—This letter was referred to the authors, who reply:

To the Editor:—The only reason the physiologic principles governing the treatment of gastric and duodenal ulcers were not discussed more extensively in our article in THE JOURNAL was that of brevity.

We thought that the important thing was to record the facts and results rather than to give theoretical explanations for them.

However, the remarks are both interesting and pertinent, and we would have no doubt of the importance of inhibition by enterogastrone of gastric mobility and acidity in the treatment of ulcer.

GEORGE F. DICK, M.D.
C. WESLEY EISELE, M.D.
Chicago.

PSEUDOEPITHELIOMATOUS HYPERPLASIA

To the Editor:—S. H. Mercer and M. E. Obermayer in THE JOURNAL, January 10, describe a case of "multiple pyoderma with pseudoepitheliomatous hyperplasia" which at biopsy showed features so suggestive of squamous cell carcinoma that a dermatologist and a pathologist independently made that diagnosis. The incorrectness of the histologic diagnosis was soon brought out by the clinical course of the disorder.

Of course it is often difficult to arrive at a histologic diagnosis without a thorough study of the clinical picture, yet this is sometimes done.

The sections presented in the article do not show high vascularization so essential for the diagnosis of granulomas. Atypical epithelial overgrowth with keratinization and mitosis without a tendency to cover the surface sufficiently is frequent in old ulcers.

The essential process in the sections is that of keratosis and parakeratosis pushing into the corium. In figure 2 a refractile "corps rond" can be seen which is characteristic for Darier's disease.

C. M. MEZEY, M.D., Forest Hills, N. Y.

POIKILODERMA-LIKE CHANGES ON THE SKIN FOLLOWING ARSPHENAMINE DERMATITIS

To the Editor:—I was interested to note in the article "Poikiloderma-like Changes in the Skin Following Arsphenamine Dermatitis," by Dr. A. Benson Cannon and his associates, appearing in the January 10 issue of THE JOURNAL, that the possibility of Jacobi's original case of poikiloderma atrophicans vasculare having been due to previously administered arsphenamine was mentioned. On page 128 in the middle of the first paragraph the authors state: "One wonders whether if Jacobi had examined his patient for arsenic or if he had followed him

over a long period he too might not have been able to classify the condition as being due to a postarsphenamine dermatitis. . . ."

This is a surprising statement in view of the fact that Jacobi's case was presented in 1906 and that arsphenamine (salvarsan) was not announced by Ehrlich until 1910. Of course the arsenic could have been introduced in some other form, but the possibility of arsphenamine having been the source is definitely out.

JOSEPH M. SHELTON, M.D., Washington, Pa.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, February 14, page 557.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Part III. Various centers, June. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Oral. Part II.* Atlantic City, June 6-7. Final date for filing application is March 7. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOGY: *Oral and Written. Groups A and B.* Cleveland, Jan. 14-15, 1943. Final date for filing application is Oct. 15. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* St. Paul, April, in advance of the meeting of the American College of Physicians, and Philadelphia, June, in advance of the meeting of the American Medical Association. Applications should be on file 6 weeks in advance of the date of oral examination. *Written.* Oct. 19. Final date for filing application is Sept. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: New York, May 12-13. Sec., Dr. R. Glen Spurling, 404 Brown Bldg., Louisville, Ky.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Oral. Part II. Groups A and B* Atlantic City, May or June. Final date for filing application is March 1. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral.* Baltimore, June 6 and Philadelphia, June 8. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral and Written. All Groups.* Philadelphia, June, preceding the meeting of the American Medical Association. Final date for filing application is March 1. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral.* Boston, May 15-16. Final date for filing application is March 1. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: *Oral. All Groups.* Atlantic City, June 4. Final date for filing application is April 1. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave., S. W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written. Part I.* Various centers, March 2. Sec., Dr. J. Stewart Rodman, 225 S. Fifteenth St., Philadelphia.

Georgia October Report

The Georgia State Board of Medical Examiners reports the written examination for medical licensure held at Atlanta, Oct. 14-15, 1941. The examination covered 10 subjects and included 100 questions. An average of 80 per cent was required to pass. Three candidates were examined, 2 of whom passed and 1 failed. Eleven physicians were licensed to practice medicine by reciprocity and 1 physician so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Emory University School of Medicine		(1941)	1
University of Illinois College of Medicine		(1938)	1

School	FAILED	Year Grad.	Number Failed
Boston University School of Medicine		(1923)	1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Louisville Medical Department		(1907)	Kentucky
Tulane University of Louisiana School of Medicine		(1936)	Louisiana
University of Minnesota Medical School		(1928)	Minnesota
University of Pittsburgh School of Medicine		(1936)	Penna.
Medical College of the State of South Carolina		(1940)	S. Carolina
University of Tennessee College of Medicine		(1931), (1938)	Tennessee
Vanderbilt University School of Medicine		(1917)	Tennessee
Medical College of Virginia		(1915) S. Carolina, (1935)	N. Carolina
University of Virginia Department of Medicine		(1936)	Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.
Harvard Medical School		(1939)

Kentucky December Report

The State Board of Health of Kentucky reports the written examination for medical licensure held at Louisville, Dec. 8-10, 1941. The examination covered 11 subjects and included 110 questions. An average of 70 per cent was required to pass. Four candidates were examined, all of whom passed. Seven physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
University of Chicago, The School of Medicine		(1940)	1
University of Louisville School of Medicine		(1941)	1
Tulane University of Louisiana School of Medicine		(1941, 2)	2

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Alabama School of Medicine		(1909)	Alabama
University of Kansas School of Medicine		(1930)	Kansas
Harvard Medical School		(1935)	Florida
Medical College of Virginia		(1940)	Virginia
University of Tennessee College of Medicine		(1931), (1940, 2)	Tennessee

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Yale University School of Medicine		(1936)	N. B. M. Ex.
Indiana University School of Medicine		(1940)	U.S.P.H.S.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Statute of Limitations Does Not Begin to Run Until Cessation of Treatment.—The plaintiff fell while lifting a heavy rock, April 4, 1938, his back striking against the sharp edges of a rock wall. He called in the physician defendant April 9, but as to just what symptoms, other than a pain in the back, the patient exhibited and what examination the physician made or what treatment he instituted, the reported decision does not make clear other than to state that the physician "continued to diagnose and to treat the plaintiff [patient] for lumbago," which the physician presumably continued to do until August 15, when his connection with the case ended. About June 10, the patient's condition had become no better and he, so he alleged, requested the physician to have roentgenograms made, but the physician refused to do so. Finally, on August 15, the physician sent the patient to a hospital in Omaha, where a complete examination, including roentgenograms, made by other physicians apparently revealed an injury to the left sacroiliac joint, a fracture of the laminae of the fifth lumbar vertebra on the lower left side and displaced, torn and strained muscles, cords and tendons surrounding and connected with the left sacroiliac joint of the fifth lumbar vertebra. The patient was then placed in a plaster cast to immobilize the fractures. Eventually, whether before the time of this examination or sometime later is not clear, the left sciatic nerve became impinged and the "spinal column and the sacroiliac joint became deformed."

The patient subsequently instituted an action for malpractice against the defendant, the original petition being filed April 20, 1940 and an amended petition July 19, 1940. The amended petition alleged, essentially, that the plaintiff employed the defendant as a physician to perform such services in the treatment of his injuries as were proper in such case; that it was the physician's duty to diagnose the cause, to find from an examination the injuries suffered by the plaintiff and to treat them in the manner usually done by physicians in his locality, and that the defendant failed and neglected to perform those duties. The defendant demurred to the amended petition on the ground that the suit was barred by the statute of limitations (Neb. Comp. St. Supp. 1939, Sec. 20-208) "which limits the bringing of malpractice actions to two years." The trial court sustained the demurrer, holding that the suit was barred by statute of limitations which had begun to run on April 9, 1938 when the physician failed properly to diagnose the patient's condition. The patient then appealed to the Supreme Court of Nebraska.

The only question for the determination of the Supreme Court was whether or not the patient's cause of action had been barred by the statute of limitations. This Court, said the Supreme Court, has never passed on the question as to when the statute of limitations begins to run in a malpractice action. The courts of California, Iowa, Maryland, Massachusetts, Montana and Vermont have adopted the rule that the statute begins to run from the time of the negligent act or the breach of duty rather than from the date of the damage caused. In applying that rule, said the Court, to the instant case, the malpractice charged is a breach of duty correctly to diagnose the nature and cause of the patient's disability. Therefore, treatment and prescription must necessarily be distinguished from diagnosis. The trial court reasoned:

> The injury to the patient's legal rights which gives rise to his cause of action occurs at the time that it is charged the correct diagnosis should have been made (April 9, 1938), for that is when the physician breached his duty.

The reasoning is supported by this rule. But this rule has not been applied in some other states, notably in Michigan, Minnesota and Ohio, whose courts have held that the statute does not begin to run until treatment ends. In *Schmitt* v. *Esser,* 178 Minn. 82, 226 N. W. 196, for instance, the Supreme Court of Minnesota said:

> The statute of limitations does not commence to run against a cause for malpractice of a surgeon employed to treat a fracture until his treatment ends. . . . In malpractice cases, there is, of course, difficulty in determining the precise moment when the act or omission which caused the damage took place. The neglectful or unskilful act may occur at some particular moment in months of attendance upon the patient, or it may persist and characterize the whole treatment. Therefore it would seem advisable not to apply the bar of the statute on demurrer, unless it clearly appears from the complaint that the unskilful or negligent act which caused the injury took place at a date more than two years before the action was brought.

In determining, said the Supreme Court, which of the foregoing rules we should adopt, it is necessary to review definitions applicable. It is noted that the defendant contends that faulty diagnosis, in and of itself, constituted the breach of duty owing by the physician to his patient, that the resulting damage to the patient by virtue of the treatment by the physician is separable from the diagnosis, and, apparently, that the statute should run from the time the faulty diagnosis was made. "Diagnosis" is defined by Webster's New International Dictionary, second edition, as follows: "The art or act of recognizing the presence of disease from its symptoms, and deciding as to its character; also, the decision reached." "Determination of a type or condition through case or specimen study." "Conclusion arrived at through critical perception or scrutiny." The foregoing definitions are practically the same as those contained in Dorland's American Illustrated Medical Dictionary, sixteenth edition, and in Stedman's Medical Dictionary, 1939, latest edition, with the exception that in the latter the diagnosis is divided into several parts: "clinical diagnosis," made from a study of the symptoms only (in the instant case the petition indicates that the diagnosis made by the physician was by the symptoms); "physical diagnosis, a diagnosis made by means of physical measure, such as . . . palpation and inspection." The latter is apparently the diagnosis which it is alleged in the amended petition should have been made. "Malpractice" is defined in Webster's New International Dictionary, second edition, as "the treatment of a case by a surgeon or physician in a manner contrary to accepted rules and with injurious results to the patient; hence, any professional misconduct or any unreasonable lack of skill or fidelity in the performance of professional or fiduciary duties." In Stedman's Medical Dictionary, "malpractice" is defined as "mistreatment of a disease or injury through ignorance, carelessness. . . ." In the very definition of malpractice, continued the Court, "treatment" is the predominating word and is not separated from "diagnosis." This would indicate that in the treatment of a patient the diagnosis must change from time to time, and it is commonly accepted in the medical profession that the diagnosis, in the first instance, is not binding on the physician. He should have the right, during the course of treatment, to change the diagnosis. With this in mind, it would seem that the construction placed on the alleged malpractice of the defendant physician in this case is too narrow.

In this case, said the Court, it was the defendant's duty to diagnose the cause of the patient's ailments and to treat them in the manner usually done by physicians in his locality. The physician, according to the allegations of the petition, did not give the patient such examination as would be required in such case and declined to give him a roentgen examination but continued to diagnose and treat the patient for lumbago, and by so doing the plaintiff's spinal column and the sacroiliac joint became deformed, stiff and enlarged. The patient was under observation and treatment by the defendant physician for five months. The diagnosis referred to was a continuing biweekly one, and each time an incorrect diagnosis was made and an incorrect treatment applied, the plaintiff's injuries were extended. It was not the error in the diagnosis originally made by the defendant but the adherence to the original diagnosis and course of treatment based on that diagnosis that brought about the injuries. The reason for the holdings in the line of cases last referred to, as exemplified by the Minnesota case *Schmitt* v. *Esser,* is that it is just to the attending physician that he may not be harassed by premature litigation instituted to save the right of the patient in the event that there should be substantial malpractice. The physician must have all reasonable time and opportunity to correct the evils which made the observation and treatment necessary and to correct the ordinary and usual mistakes incident to even skilled surgery. The doctrine announced in those cases is conducive to that mutual confidence which is highly essential in the relation between surgeon and patient. The treatment and employment should be considered as a whole, and if there occurred therein malpractice, the statute of limitations should begin to run when the treatment ceased. Especially is this true in a situation, such as is presented in this case, in which the patient's condition required treatment rather than surgery.

The Court accordingly held that the statute of limitations, in this case, did not begin to run until Aug. 15, 1938, when the treatment of the patient by the defendant physician ceased, and that the statute did not operate as bar until Aug. 15, 1940. Hence, since the petitions were filed before that date, the trial court was in error in sustaining the demurrer. The action of the trial court was reversed and the cause was remanded for trial.—*Williams v. Elias, 1 N. W. (2d) 121 (Neb., 1941).*

Society Proceedings

COMING MEETINGS

American Association of Anatomists, New York, April 1-3. Dr. Eliot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.

American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.

American Association of Pathologists and Bacteriologists, St. Louis, April 2-3. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.

American Physiological Society, Boston, March 30-April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.

American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.

American Society for Pharmacology and Experimental Therapeutics, Boston, March 31-April 4. Dr. Raymond N. Bieter, University of Minnesota Medical School, Minneapolis, Secretary.

American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.

American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixter, 319 Longwood Ave., Boston, Secretary.

Central Surgical Association, Chicago, Feb. 27-28. Dr. George M. Curtis, Ohio State University, Columbus, Ohio, Secretary.

Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase, St., Baltimore, Secretary.

Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Shaler Richardson, 111 West Adams St., Jacksonville, Secretary.

Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.

Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Shoulders, 706 Church St., Nashville, Secretary.

Tri-States Medical Association of the Carolinas and Virginia, Greenville, S. C., Feb. 23-24. Dr. J. M. Northington, 804 Professional Bldg., Charlotte, N. C., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. of Digestive Diseases, Fort Wayne, Ind.

8:443-474 (Dec.) 1941

Problems Encountered in Use of Aluminum Hydroxide Gel by Nasogastric Drip in Treatment of Peptic Ulcer. G. H. Drumheller, Pittsburgh.—p. 443.

*Prompt Feeding Program for Bleeding Gastric and Duodenal Ulcer: Report on Thirty-Two Cases and Analysis of 1,396 Recorded Cases. J. T. L. Nicholson and T. G. Miller, Philadelphia.—p. 446.

Withdrawal of Chloride from Blood by Gastric Glands. F. D. Mann, J. H. Grindlay and F. C. Mann, Rochester, Minn.—p. 451.

Value of Meat as Antiscorbutic. V. E. Levine, Omaha.—p. 454.

*Occurrence of Avitaminosis A in Diseases of Liver. M. G. Wohl and J. B. Feldman, Philadelphia.—p. 464.

Effect of Antuitrin S and Posterior Pituitary Extract on Cinchophen Ulcers in Dogs. B. Slutzky, C. M. Wilhelmj and M. Stoner, Omaha.—p. 469.

Effect of Elevated Metabolism on Rate of Intestinal Contractions. M. J. Oppenheimer and N. M. Glyer, Philadelphia.—p. 471.

Rate of Rhythmic Contraction of Small Bowel of Rabbits as Influenced by Experimentally Produced Hyperthyroidism. K. B. Castleton, Salt Lake City, note by W. C. Alvarez, Rochester, Minn.—p. 473.

Prompt Feeding for Bleeding Ulcer.—Nicholson and Miller applied during the past three years the principle of prompt feeding in bleeding ulcer proposed by Meulengracht in 1933. They report 32 consecutive cases of grossly bleeding gastric, duodenal or gastrojejunal ulcer, including 2 of diffuse erosive or ulcerative gastritis, with an analysis of 1,396 recorded cases. Meulengracht's original diet contained a generous supply of bland food and sliced and ground meats. Many physicians were led to believe that this diet, especially the meat ingredient, is an important feature of the treatment. Meulengracht, however, has pointed out that the principle he proposed is that of prompt feeding and that the type of diet is of secondary importance. The authors therefore, included in their series and in that collected from the literature all cases in which feeding was done during hemorrhage, irrespective of the nature of the diet. An analysis of 1,396 cases of gross bleeding from gastric or duodenal ulcer in which treatment was with prompt feeding and a reasonable amount of fluid showed a gross mortality of 3.1 per cent and a net mortality of 1.9 per cent. These results are far better than those for any other type of treatment, medical or surgical. Morphine should be strictly avoided because of its depressing effect on the tonicity of the musculature of the duodenum and probably also of the stomach. The prompt feeding therapy probably is effective because it meets nutritional demands, supplies fluids to counteract shock, neutralizes the gastric acidity (thus preventing further erosion in the area of the ulcer) and increases intragastric and intraduodenal pressure, thus tending to close the open and bleeding vessel.

Avitaminosis A in Diseases of Liver.—Wohl and Feldman record further observations on the occurrence of vitamin A deficiency in patients with hepatic disease in whom jaundice was a significant clinical manifestation. The method used for determining vitamin A deficiency consisted in measuring the ability of the patient to adapt himself to darkness. The dark adaptation test for vitamin A deficiency was utilized for 36 patients with various forms of hepatic disease. The results show that this procedure is of value in the estimation of hepatic parenchymal damage with the inference that such a process is associated with a change in vitamin A metabolism. Jaundice of itself had no particular effect on dark adaptation. The prothrombin level did not parallel the dark adaptation in 50 per cent of the cases investigated, although the tests of hepatic function and the dark adaptation were indicative of hepatic damage. The usual laboratory and clinical estimations of hepatic function may be augmented by the routine use of the dark adaptation test with certain qualifying points, such as absence of intrinsic retinal disease, of gastrointestinal disturbances interfering with absorption or adequate vitamin A intake, among others.

American Journal of Surgery, New York

54:587-810 (Dec.) 1941

*Juvenile Osteochondral (Chondroepiphysitis) Hypothyroidism. R. L. Schaefer and F. H. Purcell, Detroit.—p. 589.

Bone Drilling in Resistant Chronic Ulcers: New Principle. F. H. Albee, New York.—p. 605.

Differential Diagnosis of "Painful Hip" in Childhood. P. C. Colonna, Oklahoma City.—p. 609.

Primary Bronchogenic Carcinoma of Lung: Clinical and Roentgen Study of Thirty-Eight Cases Over Period of Twelve Years. H. A. Olin and C. A. Elliott, Chicago.—p. 614.

Pathology of Appendical Stump with Suggestions for Prophylaxis. V. L. Schrager, Chicago.—p. 629.

Emergency Control of Postpartum Hemorrhage: Experience with Supplementary Technic. C. C. Briscoe, Philadelphia, and R. A. Wilson, Brooklyn.—p. 634.

Treatment of Pelvic Infection by Iontophoresis of Choline Compound. A. H. Rosenthal, Brooklyn.—p. 639.

Surgical Treatment of Axillary Hidrosadenitis Suppurativa. H. B. Macey, Rochester, Minn.—p. 643.

Postoperative Gastric Drainage: Quantitative Study for Indication of Reestablishment of Gastrointestinal Motility Following Gastric Operations. J. P. Warbasse Jr., New Bedford, Mass.—p. 648.

Prevention of Postoperative Meningitis by Intracranial Implantation of Powdered Sulfanilamide. Y. D. Koskoff and N. M. Wall, Pittsburgh.—p. 653.

Biochemical Aspects of Preoperative and Postoperative Treatment: Its Practical Application. R. Green, Chicago.—p. 659.

*Peritoneoscopy, with Special Reference to Widening Its Applications. J. E. Hamilton, Louisville, Ky.—p. 668.

Healing of Operative Wound in Syphilitic Women. H. C. Falk and I. Kempner, New York.—p. 674.

Congenital Duodenal Obstruction. R. O. Lyday, Greensboro, N. C.—p. 678.

Postoperative Evisceration: Résumé of Literature and Report of Five Cases. M. L. Bobrow, New York.—p. 682.

Ultraviolet Irradiation of Autotransfused Blood in Treatment of Puerperal Sepsis. E. W. Rebbeck, Pittsburgh.—p. 691.

Treatment of Surgical and Traumatic Shock with Citrated Plasma-Saline Mixture. C. S. White, J. L. Collins and J. J. Weinstein, Washington, D. C.—p. 701.

New Operative Procedure for Dupuytren's Contracture. E. L. Stern, New York.—p. 711.

Preparation of Superficial Wounds for Skin Grafting by Local Use of Sulfanilamide and Sulfanilamide Allantoin Ointment. J. R. Veal, R. G. Klepser and M. P. DeVito, Washington, D. C.—p. 716.

Use of Plaster Slipper in Management of Simple Fractures of Toes. J. E. Macmanus, Cooperstown, N. Y.—p. 721.

Juvenile Osteochondral Hypothyroidism.—Schaefer and Purcell contend that the so-called juvenile chondroepiphysitis is due neither to an inflammatory process nor to vascular changes but to hypothyroidism with the consequent lack of its tissue differentiating factor. The confusing terminology, consisting of proper names which are related to the various joints involved and which designate for each a separate clinical entity, should be done away with entirely and the term chondroepiphysitis changed to "osteochondral hypothyroidism." In an earlier report the authors pointed out that 91 of 258 patients with endocrinopathy presented characteristic chondroepiphysial changes. Of these 91 all but 5 had primary or secondary signs of hypothyroidism, such as mental retardation, characteristic structural changes, delay in the time of appearance of osseous centers, increase in the blood cholesterol and decrease in the basal metabolic rate. The following endocrine diagnoses were noted: hypothyroidism, adiposogenital pituitarism, pituitary dwarfism and eunuchoidism. The osseous changes were revealed by roentgenographic studies, which the authors deem a most important diagnostic procedure in endocrine disorders. Characteristic chondroepiphysial changes are occasionally revealed by roentgenoscopy in apparently normal children. The authors believe that this is a sign of deficient thyroid function which has prevented proper epiphysial differentiation. Therefore, regardless of the clinical syndrome patients exhibiting such characteristic bone changes should be considered as hypothyroid and treated with desiccated thyroid to bring about normal bone differentiation. The authors report on 27 patients with juvenile osteochondritis. The disturbances had been classified as Perthes' disease, slipping of the upper femoral epiphyses, Osgood-Schlatter disease,

apophysitis, Köhler's disease or epiphysitis of the spine. The ages ranged from 5 to 15 years. Every patient routinely received desiccated thyroid orally in full therapeutic doses. In addition, patients displaying other signs of endocrine dysfunction, such as late descent of the testicles and delay in adolescence, were treated with the pituitary sexlike hormone. An attempt was made to correct obesity when it was present. Immobilization was not necessary, except in a case of Osgood-Schlatter disease. Hospitalization was not required, and the expense was reduced to a minimum. Normal ossification of the epiphyses was accelerated, as indicated by subsequent roentgen ray examinations. Clinical cure was rapid.

Peritoneoscopy.—Peritoneoscopy, according to Hamilton, no longer requires introduction or apology. Its safety, simplicity and accuracy in diagnosis have been demonstrated by Ruddock, Benedict, Thieme, Olim and others. There are now over three hundred peritoneoscopes in use throughout this country, the Ruddock being the most widely accepted. The author reports his experiences with eighty peritoneoscopies made for 75 patients in the diagnosis of a variety of conditions. In 68 instances a problematic diagnosis was confirmed or changed or new and significant information added. Laparotomy was obviated seventeen times and was definitely elected in 11 instances when the indication for operation was in doubt. The opinion seems to prevail that the method should not be employed in cases of acute inflammatory or other serious conditions in which an adverse outcome might be attributed to the instrumentation. Yet if peritoneoscopy in such a case can spare the patient the much more serious exploratory laparotomy and at the same time help one establish a diagnosis or decide whether operative intervention is indicated, it surely is justified. If surgical intervention should be found necessary this preliminary procedure will not have added significantly in time or trauma to the operation. New or little exploited indications for peritoneoscopy are advanced: (1) differential diagnosis of jaundice; (2) differentiation between bleeding peptic ulcer and ruptured esophageal varix; (3) differential diagnosis of appendicitis and salpingitis, (4) the question of whether a gunshot or a stab wound of the abdomen is penetrating, and (5) rupture of a follicular cyst of the ovary in a woman with uterine bleeding in whom other measures short of surgical intervention have failed.

American Review of Tuberculosis, New York

44:637-780 (Dec.) 1941

Civilian Health as Factor in National Defense. K. E. Miller, Fort Sam Houston, Texas.—p. 637.
Pulmonary Tuberculosis: Its Exclusion from Navy. R. E. Duncan, Washington, D. C.—p. 651.
*Tuberculosis in Army: Tuberculosis Problem of World War No. 1 and in Present Mobilization. W. C. Pollock, Denver.—p. 658.
*Sources of Infection in Tuberculosis Case Finding: Report of Experience. G. E. Harmon and B. H. Douglas, Detroit.—p. 675.
*Tuberculosis Among Nurses: Study of Effect of Tuberculosis Service on Incidence of Tuberculous Infection and Disease Among Student Nurses. D. R. Hastings and B. G. Behn, Oak Terrace, Minn.—p. 681.
Tuberculin Tests in British Guiana. O. M. Francis.—p. 695.
Temperature Curve in Intestinal Tuberculosis Complicating Chronic Pulmonary Tuberculosis. E. Rosencrantz and Angela M. Piscitelli, San Francisco.—p. 704.
Medlar Index in Pulmonary Tuberculosis. W. S. Stanbury and M. Viola Rae, Hamilton, Ont., Canada.—p. 710.
Tuberculosis of Ribs. J. D. Wassersug, Middleboro, Mass.—p. 716.
Single Cannula Pneumonolysis: Further Developments in Instruments and Technic. J. W. Cutler, Wawa, Pa.—p. 722.
Treatment of Empyema: Treatment of Tuberculous and Mixed Infection Empyema with Bactericidal Substance Reinforced with Wetting Agents. S. A. Petroff, Myron Herman and L. Palitz, Staten Island, N. Y.—p. 738.
Guinea Pig Inoculation and Culture: Disagreement Between Two Methods Due to Random Sampling. W. N. Berg, New York.—p. 757.

Tuberculosis in the Army.—Pollock believes that the mobilization survey of 1941 to 1945 will be the greatest tuberculosis case-finding effort ever carried out in this country. The survey will consist of a physical examination, a roentgen examination of the chest, the disposition of soldiers with tuberculosis and the notification of proper health authorities. Essentially the same program will be carried out on demobilization. Up to now the 14 by 17 inch (35 by 43 cm.) film has been used for roentgen study of the chest, but at present and in the future the 4 by 5 inch (10 by 12.7 cm.) fluorogram will be used. Two exposures will be made; one will be sent to the War Department as a permanent record. On demobilization, two fluorograms will be taken and similarly disposed of. The tentative plan for the disposition of men with tuberculosis is as follows: 1. Enlisted men in whom tuberculosis develops in line of duty (service of six months or more, unless the tuberculosis is acute) will be discharged from the Army and transferred to Veterans Administration facilities. 2. Enlisted men showing evidence of pulmonary tuberculosis in excess of that acceptable for military service when surveyed will be discharged to their own care if hospitalization is not needed. 3. Men nearing retirement and noncommissioned officers of the three higher grades with a favorable prognosis for return to military service within one year may be retained in service at Army hospitals. 4. Men in need of hospitalization, regardless of line of duty or physical status, may be hospitalized in specific Army hospitals. The author advocates the rejection of men with roentgen evidence of the reinfection type of tuberculosis. Healed reinfection tuberculosis can soon become reactivated under the conditions of military service. He presents case histories which show that pulmonary tuberculosis can develop shortly after the induction of a man into service although the roentgenogram of the chest was negative on entrance into service. The tuberculosis survey of young adults eliminates tuberculosis from the group only for the moment. The Army tuberculosis survey has been improved recently; roentgenograms of practically all selectees are taken prior to their induction into the Army, and those with tuberculosis are not enrolled.

Sources of Tuberculous Infection.—Harmon and Douglas satisfactorily examined (by means of a tuberculin test which gave a negative result or by roentgen study) 747 family associates of 405 persons with noninfectious tuberculosis in an attempt to discover the sources from which the 405 might have obtained their infection. The examination revealed that among 747 persons there were 26 with the active adult type of tuberculosis whose condition was diagnosed for the first time. The 26 persons may well have been the sources from which the members with noninfectious tuberculosis obtained their infection. The conclusion is apparent that sources of infection must be searched for and that the endeavor may be almost as productive as the search for tuberculous infection among contacts.

Tuberculosis Among Nurses.—Hastings and Behn determined the tuberculosis rate among 706 student nurses in six different hospitals in Minneapolis. None of the hospitals have a tuberculosis service, and none knowingly admit tuberculous patients. Three of the hospitals had affiliation with Glen Lake Sanatorium. The student nurses in two of these three hospitals spent six weeks at the sanatorium on tuberculosis service and those of the third hospital twelve weeks. The first class studied entered training in the spring of 1929 and the last in the fall of 1935. Of the 706 girls 155, or 22 per cent, have not replied to any questionnaire; thus 78 per cent have been followed one and five-tenths to eight and five-tenths years since they left training, or an average of four years. The incidence of infection (reaction to tuberculin) and of tuberculosis was no higher for girls about to enter training than for any similar group of young women. The infection rate (change from a negative to a positive reaction to tuberculin) was about 11.6 per cent higher for the nurses who spent part of their training period on tuberculosis service. The morbidity rate was also higher (18 as against 12 per thousand for the group who did no tuberculosis service), but the available data do not make this difference significant. At the beginning of the girls' training period the roentgenograms of 96.3 per cent were normal. At the end of three years of training the percentage was 93.3 for nurses who did tuberculosis service and 94.8 for those who did not. The morbidity rate was somewhat higher for all the nurses than the 1.5 per cent reported for young women in general. To date clinical tuberculosis has developed in 2.2 per cent of the 703 girls who were allowed to enter training. The incidence for the nurses who gave a negative reaction to tuberculin on entrance was more than three times that for those who reacted to tuberculin on entrance. There were 28 nurses with the adult type of tuberculosis, and 1 of these (a girl with a diagnosis of tuberculosis on entrance who was dismissed immediately) died. The tuberculosis of 9 was discovered during training; in 7 the

tuberculosis was minimal, in 1 it was unclassified and 1 had pleurisy with effusion. Of the 14 whose condition was discovered after they had left training, the disease in 10 was minimal, in 3 it was moderately advanced and 1 had pleurisy with effusion (possibly tuberculous). Although the incidence among nurses is higher than that among young women in general, the disease is discovered in the earlier stages and the mortality is lower.

Archives of Dermatology and Syphilology, Chicago

44:983-1194 (Dec.) 1941

*Hyposensitization to Poison Ivy. B. Shelmire, Dallas, Texas.—p. 983.
Sulfonated Oil as Detergent: Its Use in Dermatologic Ward. C. G. Lane and I. H. Blank, Boston.—p. 999.
*Treatment of Lupus Erythematosus with Bismarsen. R. S. Weiss, A. H. Conrad, A. H. Conrad Jr. and R. O. Pfaff, St. Louis.—p. 1009.
*Kahn Verification Test: Appraisal of Test Based on Clinical and Serologic Evidence. L. Chargin and C. R. Rein, New York.—p. 1031.
Fox-Fordyce Disease: Report of Case. W. F. Spiller and E. B. Ritchie, Galveston, Texas.—p. 1051.
Massive Arsenotherapy by Continuous Intravenous Drip Method: Treatment of Acute Syphilis of Rabbits. J. A. Kolmer, with technical assistance of Anna M. Rule, Philadelphia.—p. 1055.
Nummular Eczema: Its Clinical Picture and Successful Therapy. P. Gross, New York.—p. 1060.
Avoidance of Fatal Complications in Therapeutic Malaria. U. J. Wile and L. K. Mundt, Ann Arbor, Mich.—p. 1078.
Alopecia Liminaris Frontalis: Comment on Causation and Report of Four Cases. G. A. Spencer, New York.—p. 1082.
Poikilodermatomyositis: Report of Case with Complete Postmortem Examination. R. C. Horn Jr., New York.—p. 1086.
Mesquite Wood Dermatitis. E. C. Fox, Dallas, Texas.—p. 1098.
Effect of Sulfanilamide and Its Derivatives on Fungi: Preliminary In Vitro Experiments. G. M. Lewis and Mary E. Hopper, New York.—p. 1101.

Hyposensitization to Poison Ivy.—According to Shelmire, persons susceptible to poison ivy usually show a monovalent sensitivity. Since in these persons the criteria for proof of reduced cutaneous sensitivity can be easily controlled during actual clinical exposure, a study of hyposensitization to this plant was undertaken. Ingestion of approximately 2 cc. of a stable and potent poison ivy leaf oil is necessary to reduce the cutaneous sensitivity of the average person from the clinical to the subclinical level. The routine procedure was oral administration of 1 ounce (30 cc.) each of the 1:100, the 1:50 and, finally, the 1:25 dilution of the oleoresin in corn oil during a period of approximately eight months. The present study was undertaken to determine the reduction in cutaneous sensitivity afforded by the ingestion of 1 ounce of 1:25 or 1:10 dilution of a leaf or root oleoresin. Twenty persons sensitive to poison ivy ingested during a period of several months 1 ounce of a 1:25 or 1:10 dilution of poison ivy leaf or root oleoresin in corn oil. Pretreatment and post-treatment quantitative patch tests demonstrated that varying degrees of reduction of cutaneous sensitivity followed ingestion of the specific oil. No reduction of the level of sensitivity of the skin occurred in untreated controls. The results of oral therapy paralleled those usually attained in the percutaneous treatment of asthma and hay fever, satisfactory clinical results being attained in some cases and unsatisfactory results in others. Clinical exposures and repeated testing of the skin with dilutions of the oleoresin in corn oil did not result in an increase in the level of cutaneous sensitivity of the majority of persons hyposensitized by oral therapy.

Treatment of Lupus Erythematosus with Bismarsen.—According to Weiss and his associates, the treatment of the discoid type of lupus erythematosus with gold salts has not been entirely satisfactory. Since Schamberg's introduction of the use of gold sodium thiosulfate, it has been recognized that the disease may yield to treatment not only with gold salts but with other compounds of heavy metals. The authors have seen the condition clear up from the use of bismuth salicylate, sodium or potassium bismuth tartrate, acetarsone and even arsenic trioxide, in the form of "asiatic capsules." They felt that the use of heavy metals in combination might be worthy of trial and selected a familiar combination of arsenic and bismuth, bismuth arsphenamine sulfonate (bismarsen). The authors review a series of 28 patients with discoid lupus erythematosus whom they treated with bismarsen. The contraindications to the use of bismarsen are cachexia, severe anemia, endocrine disturbances, advanced tuberculosis of the lungs, cardiac insufficiency, hemorrhagic disease, epilepsy and severe renal dysfunction. The regimen employed was as follows: The tolerance of the patient was tested by giving 0.05 Gm. of the drug twice weekly for one week. The dose was then raised to 0.1 Gm. twice weekly, and in many cases after the drug was found to be well tolerated the dose was raised to 0.2 Gm. twice weekly. All injections were given intramuscularly. Fourteen of 28 patients treated with bismarsen made an apparent recovery, 12 patients showed improvement and 2 patients showed no improvement. The authors conclude that bismarsen may be of value in the treatment of discoid lupus erythematosus but that more patients must be treated before its use can be adequately evaluated. Insufficient time has elapsed for one to estimate the permanence of the results. Reports about blood dyscrasias after treatment with bismarsen induced the authors to make frequent blood counts. In 5 cases the leukocyte count dropped below 5,000. When this was the case either medication was discontinued or the dose was cut. Since nitritoid reactions may occur the patient should be observed for at least one-half hour after the drug is injected. The significance of this report lies not so much in the results reported but in the fact that a combination of heavy metals in the form of a double salt may cause involution of the lesions of discoid lupus erythematosus. This may lead to further experimentation with other combinations of metals, leading perhaps to the discovery of less toxic and more effective drugs.

Kahn Verification Test.—Chargin and Rein point out that there are no truly specific tests for syphilis. The lipids employed in the various tests are not antigens in the strict biologic sense. They are, however, capable of producing reactions which are diagnostic of syphilis to a high degree. All tests so far devised may give a negative reaction in the presence of syphilis and a positive reaction in its absence. Antepartum and premarital tests must have enormously increased the number of persons now being needlessly subjected to therapy. Kahn described three basic types of reactions with the verification test: 1. The syphilitic type, which occurs when precipitation is greater at 37 than at 1 C.; this usually corresponds to positive reactions (to serodiagnostic tests) associated with syphilis. 2. The general biologic (nonsyphilitic) type, occurring when precipitation is greater at 1 than at 37 C.; this usually corresponds to a positive reaction (to serodiagnostic tests) associated with nonsyphilitic conditions. 3. The negative type, which occurs when there is no precipitation at 1 or at 37 C. and usually corresponds to a negative serodiagnostic reaction. When the results of the verification tests are irregular, so that they cannot be classified with any of these three types, the reactions are referred to as "inconclusive." The reaction to the Kahn verification test was studied for 1,565 persons with various conditions, comprising syphilis, nonsyphilitic dermatoses, questionable conditions, pregnancy, contagious diseases, pinta, malaria, leprosy and other conditions. In the group of 349 syphilitic patients who had received varying amounts of treatment the verification test gave the syphilitic type reaction in 100 per cent of those with a strongly positive serodiagnostic reaction, in 76.5 per cent of those with a weakly positive reaction and in 40.2 per cent of those showing a doubtful reaction. There was no reaction of the syphilitic type in the patients with a negative serodiagnostic reaction. The incidence of the general biologic type of reaction to the verification test in the group with a negative serologic reaction was 7.1 per cent and in the group with a doubtful serologic reaction 12.1 per cent. In the nonsyphilitic group (269 in number) there were but 2 patients who had a syphilitic type of reaction to the verification test. The diagnosis of syphilis could not be established for these patients. The incidence of biologic reactions in this group varied from 13.8 to 47.6 per cent. In the questionable group (of 253 members) 83 patients (32.7 per cent) gave a syphilitic type of reaction to the verification test. Further study is necessary to determine whether they actually have syphilis. The incidence of the general biologic (nonsyphilitic) type of reaction in this group varied from 2.3 to 38.6 per cent. Of the patients with acute contagious diseases the general biologic (nonsyphilitic) type of reaction to the verification test was obtained in 29.3 to 64 per cent, and of the pregnant women this type of reaction

was obtained in 21.2 to 55.5 per cent. The highest incidence of the general biologic (nonsyphilitic) type of reaction was associated with the doubtful serodiagnostic reactions in all groups. The percentage of the syphilitic type of reaction to the verification test increases with the increase in the titer of serodiagnostic reaction. In the group of 268 patients with pinta, all of whom gave strongly positive serodiagnostic reactions, 83.9 per cent gave a syphilitic type of reaction to a verification test. Agreements as well as discrepancies were observed in a number of blood specimens that were subjected to repeated verification tests.

Archives of Internal Medicine, Chicago

68:1043-1254 (Dec.) 1941

*Elliptic Erythrocytes in Man. Helen Wyandt, Omaha; P. M. Bancroft, Lincoln, Neb., and T. O. Winship, Rizal, Philippine Islands.—p. 1043.

*Efficacy of Intravenous Sodium Bicarbonate Therapy in Treatment of Diabetic Ketosis. L. B. Owens, J. Wright and Edna Brown, Cincinnati.—p. 1066.

Rheumatic Pneumonia. E. Z. Epstein and E. B. Greenspan, New York.—p. 1074.

*Tuberculoma of Hypophysis with Insufficiency of Anterior Lobe: Clinical and Pathologic Study of Two Cases. J. D. Kirshbaum and H. A. Levy, Chicago.—p. 1095.

Metabolism in Organic Hyperinsulinism: II. Effects of Epinephrine on Glycemic Level and on Combustion of Carbohydrate. J. W. Conn and Elizabeth Stern Conn, Ann Arbor, Mich.—p. 1105.

Id.: III. Effects of Adrenal Cortical Extract on Blood Sugar and on Sodium and Nitrogen Equilibrium. J. W. Conn and Elizabeth Stern Conn, Ann Arbor, Mich.—p. 1115.

Hypothermia: Report of Case in Which Patient Died During Therapeutic Reduction of Body Temperature, with Metabolic and Pathologic Studies. J. H. Talbott, W. V. Consolazio and L. J. Pecora, Boston.—p. 1120.

Therapy of Tetanus: Study of 276 Cases. R. Spaeth, Chicago.—p. 1133.

Biologic False Positive Serologic Reactions in Tests for Syphilis: II. Occurrence with Organic Diseases Other Than Syphilis. C. F. Mohr, J. E. Moore and H. Eagle, Baltimore.—p. 1161.

Pulmonary Cavitation Associated with Coccidioidal Infection. W. A. Winn, Springville, Calif.—p. 1179.

Prognostic Value of Various Clinical and Electrocardiographic Features of Acute Myocardial Infarction: II. Ultimate Prognosis. S. A. Levine, Boston, and F. F. Rosenbaum, Ann Arbor, Mich.—p. 1215.

Review of Neuropsychiatry for 1941. S. Cobb, Boston.—p. 1232.

Elliptic Erythrocytes.—Wyandt and her associates report the observation of elliptic erythrocytes in 86 members of three interrelated German families. There were definitely more males with the anomaly than without it, and more males were affected than females, especially when the father was the affected parent. In one instance both parents had the anomaly. From their mating there were 2 sons with round cells and 1 daughter with elliptic cells, spherocytes and other evidences of hemolytic icterus, and 2 sons died before the study was begun. Of two pairs of twins, 1 of a fraternal pair had elliptic cells and the other had not. Of the other pair, 1 died at the age of 11 months and the living twin showed the anomaly. Sections of tissue made at necropsy of the twin who died showed only round cells. The constancy of shape of the cells was established by daily counts on 1 subject during his stay in a hospital for three and a half weeks. The percentage of elliptic cells varied from 88 to 92 and that of the sausage-shaped cells from 17 to 25. The authors were unable to substantiate the assertion by Terry and his associates that elliptic erythrocytes settle more readily, are heavier and are less fragile than normal erythrocytes. All but 1 of the subjects were singularly free from anemia, and the individual family members were unusually healthy and long lived. The exception was a child both of whose parents had elliptic cells in large numbers. The erythrocyte count of this child was 4,200,000 and the hemoglobin concentration 9.8 Gm. per hundred cubic centimeters. Except for the increased fragility the blood picture of the child was similar to that in hypochromic anemia, with elliptocytosis and poikilocytosis. The definite occurrence in the blood of this child of elliptic cells and of spherocytes suggests the simultaneous occurrence of the two anomalies, even though spherocytes were not present in the blood of either parent. The fact that both parents are elliptic cell bearers may have some bearing. With 3 exceptions, 2 of them involving children, the mean corpuscular volume, hemoglobin and hemoglobin concentration of the persons examined were within normal limits. In the 3 cases there was slight microcytosis. This led the authors to think that slight polycythemia might accompany elliptocytosis. The cause of the anomaly is unknown. The change to the elliptic shape takes place during or after the reticulocyte stage and is inherent in the structure of the cell itself. The elliptic cell is a form of old erythrocyte—an end stage—since a few of these cells are present in the blood of all normal persons. Recent reports indicate that the anomaly is more common than is generally believed. The authors say that during the four years in which their study has been in progress they encountered 2 additional cases in approximately seven thousand examinations. The anomaly has been reported for almost every people except the Chinese, Japanese and Hindus, with a preponderance among the Germans. Elliptocytosis is transmitted as a simple mendelian dominant unit character. The family in which both parents and 1 child show the anomaly and 2 children do not proves that the anomaly could not be a recessive characteristic. Although rare, elliptocytosis might aid in the identification both of person and of paternity. Since the anomaly is easily recognized it should be valuable in linkage studies of various inherited characteristics.

Diabetic Ketosis.—According to Owens and his co-workers, the problem of death from diabetic ketosis is not solved by correcting the content of blood sugar and blood ketones and the carbon dioxide combining power. The mental state, the duration of mental symptoms, the amount of treatment, the age of the patient, circulatory collapse and infection all play a part in recovery. The authors considered the foregoing factors and compared the mortality among patients treated with sodium bicarbonate with that for patients not so treated to determine whether its administration is practical. Twelve unselected patients with severe diabetic ketosis were given the usual forms of therapy. In addition, 9 were given a 5 per cent solution of sodium bicarbonate intravenously immediately or three hours after admission. The other 3 were used as controls. In the 3 control patients the carbon dioxide combining power rose progressively (15, 15 and 23 volumes per cent respectively) during the nine hours of study after admission to the hospital. The ketones in the blood fell progressively in inverse proportion to the rise of the carbon dioxide combining power. The average rise of the carbon dioxide combining power in the 9 patients given from 15 to 55 Gm. of sodium bicarbonate was more than twice as great as that in the controls, but the results were not consistent. The rise produced no effect on the mental state, the blood pressure, the urinary output or any other vital sign, but Kussmaul respiration was usually relieved before there was any appreciable drop in the level of ketones in the blood. The total urinary output of ketones was measured for 4 patients receiving sodium bicarbonate; the excretion of 3 was less immediately after the medication than during the subsequent three hours. This decrease is significant because in 2 of the 3 patients an increase in the ketones in the blood occurred concomitantly with a lessened amount in the urine. In the fourth patient, the ketones in the blood increased after sodium bicarbonate had been given but the amount in the urine fell progressively. The authors conclude that the intravenous administration of sodium bicarbonate has no antiketogenic action in diabetic ketosis and that it does not facilitate the elimination of ketones that have already accumulated in the blood and urine. Study of the mortality among 154 consecutive patients with diabetic ketosis likewise failed to show any benefit in 47 of the patients given sodium bicarbonate therapy. Of 5 with extremely mild or mild ketosis none died, of 15 with moderately severe ketosis 6 died, of 13 with severe ketosis 6 died and of 14 with extremely severe ketosis 13 died. Of the 107 not given sodium bicarbonate 8 had extremely mild ketosis, and none of these died, and of 18 with mild ketosis 1 died, of 32 with moderately severe ketosis 11 died, of 32 with severe ketosis 15 died and of 17 with extremely severe ketosis 16 died. If the severity of the ketosis is considered there appears to be no difference in the mortality rate among the patients treated with sodium bicarbonate and those given no alkali.

Tuberculoma of Hypophysis.—Kirshbaum and Levy point out that only 2 tuberculomas of the anterior lobe of the hypophysis producing symptoms of pituitary insufficiency were encountered at necropsy in 14,160 cases in the department of pathology of the Cook County Hospital from 1929 to 1940 inclusive. Six hundred and fifty-two cases of various types of pulmonary tuberculosis and 368 of tuberculous meningitis with no hypophysial involvement were observed. The record of the authors' first case of tuberculoma fulfilled the criteria of pituitary cachexia (Simmonds' disease), with the clinical syndrome of amenorrhea, severe asthenia, definite and rapid loss of weight with cachexia, hypotension, dryness of the skin and hair, a low basal metabolic rate and high dextrose tolerance. The picture was completed by total destruction of the anterior lobe of the hypophysis by a tuberculous lesion, with evidence of chronic pulmonary tuberculosis and hypoplasia of the thyroid. In the second case, although pituitary failure was evidenced by a eunuchoid body build with a feminine distribution of hair and hypotension, an old sclerosed tuberculoma of the anterior lobe, with atrophy of the zona fasciculata of the adrenal cortex and possibly the results of pressure on the seventh cranial nerve and the optic chiasm were observed. Hypofunction of the pituitary gland was suspected clinically, particularly in the first case. Tuberculosis, because of its rarity, was not suspected in either case. The hypophysis may be involved by acute miliary spread of the disease, extension from contiguous basilar meningitis or sphenoid osteomyelitis or hematogenous dissemination with latent exacerbation producing conglomerate tubercles. Hypophysial symptoms are not usually associated with the first two types, while the symptoms of the third type depend on the part of the gland and the surrounding structures involved.

Archives of Ophthalmology, Chicago

26:945-1140 (Dec.) 1941

Keratoconjunctivitis Sicca. G. M. Bruce, New York.—p. 945.
Socket Reconstruction: New Form and Method of Handling Skin Graft. W. L. Hughes, Hempstead, N. Y.—p. 965.
*Ocular Manifestations in Myasthenia Gravis. R. D. Mattis, Boston.—p. 969.
Etiology of Uveitis: Clinical Study of 562 Cases. J. S. Guyton and A. C. Woods, Baltimore.—p. 983.
Unusual Case of Hodgkin's Disease: Preliminary Report. J. W. Avefy and J. W. Warren, Hollywood, Calif.—p. 1019.
Krukenberg's Spindle: Study of 202 Collected Cases. W. H. Evans, R. E. Odom and E. J. Wenaas, Youngstown, Ohio.—p. 1023.
Theories of Cataract. J. G. Bellows and H. Chinn, Chicago.—p. 1066.

Myasthenia Gravis.—Mattis suggests that the ocular manifestations in myasthenia gravis are due not to a contracted state of the musculature involved but to some neuromotor dysfunction that is benefited by prostigmine preparations. In this disease the extraocular muscles exhibit "transient tropia" and "drifting phoria," which in some cases are relieved by prostigmine preparations. The pupillary reactions are usually normal and appear to be unchanged by prostigmine therapy. Pronounced refractive errors and changes in visual acuity have not been associated with myasthenia gravis. The accommodative power is usually normal and appears to be unchanged by therapy. The ocular manifestations of myasthenia gravis, the author believes, are more common than is generally thought. The intramuscular injection of prostigmine methylsulfate solution is a valuable diagnostic aid.

Delaware State Medical Journal, Wilmington

13:219-232 (Nov.) 1941

Treatment of Convulsions. K. M. Corrin, Wilmington.—p. 219.
Purpura Hemorrhagica: Case Report. A. G. Gluckman, Wilmington.—p. 222.

Missouri State Medical Assn. Journal, St. Louis

38:393-426 (Dec.) 1941

Differential Diagnosis and Treatment of Those Nonhemolytic Anemic States Failing to Respond to Adequate Liver or Iron Therapy. C. A. Doan, Columbus, Ohio.—p. 393.
Modern Control of Pneumonia. H. F. Flippin, Philadelphia.—p. 398.
Development of Prostatic "Hypertrophy." C. L. Deming, New Haven, Conn.—p. 401.
Diagnosis and Treatment of Common Anorectal Conditions. L. S. Fallis, Detroit.—p. 404.

Ohio State Medical Journal, Columbus

37:1133-1232 (Dec.) 1941

English Medicine and the War. K. C. McCarthy, Toledo.—p. 1149.
Tularemia and Its Treatment with "Lyovac" Antitularemic Serum. G. E. Marr, Hamilton.—p. 1154.
Medical Review of 311 Cholecystectomies and Importance of Diagnostic Nonsurgical Biliary Drainage. A. A. Hall, Columbus.—p. 1156.
Hemochromatosis: Case Report. H. M. Gans and A. Adelman, Cleveland.—p. 1159.
Multiple Myeloma: Report of Case. S. S. Berger and J. I. Goodman, Cleveland.—p. 1163.
Jaundice Complicating Case of Twin Pregnancy. J. L. Bubis and J. I. Goodman, Cleveland.—p. 1167.
Classification of Asthma. J. H. Mitchell and W. F. Mitchell, Columbus.—p. 1171.
Relief of Prostatic Obstruction: Short Review of 132 Consecutive Cases. E. A. Ockuly, Toledo.—p. 1174.
*X-Rays in Treatment of Acne Vulgaris. H. G. Miskjian, Cleveland.—p. 1177.
Occult Carcinoma of Kidney with Metastases Simulating Primary Carcinoma of Nasopharynx. S. Koletsky, Cleveland.—p. 1180.

Roentgen Treatment of Acne Vulgaris.—Miskjian uses the following technic in treating patients with acne vulgaris with roentgen rays: He gives 150 roentgens every two weeks. This is filtered through 0.5 or 1 mm. of aluminum, and the distance from the anode is 10 inches. Three exposures are made, one to each side of the face and one vertically to the forehead. While the face is being treated the forehead is shielded (and vice versa) with a piece of heavy lead rubber. Usually eight treatments are sufficient. The author's rule is to give two roentgen treatments after all the lesions have disappeared. If erythema, no matter how slight, appears, treatment is interrupted for one to two months. After treatment has been completed the patient may remain free from active lesions indefinitely. However, in some patients one or two superficial papules will develop now and then. They resolve fairly rapidly after a period of induration only. To prevent their appearance the use of the "improved" lotio alba, beginning two months after treatment has been completed, is suggested. Patients should be warned of a probable recurrence approximately six months after roentgen treatment. The author believes that these recurrences are less frequent if roentgen therapy is not discontinued as soon as the last lesion vanishes. He does not recommend a second course of roentgen treatments for recurrences, particularly if a total of 1,500 roentgens has been given.

Public Health Reports, Washington, D. C.

56:2189-2232 (Nov. 14) 1941

Blindness, as Recorded in National Health Survey: Amount, Causes and Relation to Certain Social Factors. R. H. Britten.—p. 2191.
Treatment of Dietary Liver Cirrhosis in Rats with Choline and Casein. J. V. Lowry, F. S. Daft, W. H. Sebrell, L. L. Ashburn and R. D. Lillie.—p. 2216.

56:2233-2276 (Nov. 21) 1941

Distribution of Health Services in Structure of State Government: Chapter II. Communicable Disease Control by State Agencies. J. W. Mountin and Evelyn Flook.—p. 2233.
Ornithodoros Turicata and Relapsing Fever Spirochetes in New Mexico. G. E. Davis.—p. 2258.

56:2277-2320 (Nov. 28) 1941

Disease Outbreaks from Water, Milk and Other Foods in 1939. A. W. Fuchs.—p. 2277.
Analysis of Human Tumors Diagnosed at National Institute of Health, 1920-1939. R. D. Lillie.—p. 2284.

Rhode Island Medical Journal, Providence

24:199-216 (Nov.) 1941

Doctor William Hunter. R. Hammond, Providence.—p. 199.
Management of Pathologic Lesions of Jaws. J. A. Doherty, Boston.—p. 201.
Addison's Disease: Management of Typical Case with Desoxycorticosterone Acetate in Oil and by Pellet Implantation. M. DiMaio, Providence.—p. 203.

South Carolina Medical Assn. Journal, Florence

37:291-316 (Nov.) 1941

Treatment of Bronchial Asthma and Hay Fever with Cyclopropane. C. A. Sweatman, Columbia.—p. 291.
Intestinal Infestations. H. M. Davison, J. C. Thoroughman and J. B. Peschau, Atlanta, Ga.—p. 294.
Practical Management of Infantile Eczema. L. S. Bryan, Columbia.—p. 298.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Brain, London

64:93-196 (Sept.) 1941

Experimental Cerebral Concussion. D. Denny-Brown and W. R. Russell. —p. 93.
Spinal Cord Degeneration Produced by Dietary Means. D. Mitchell. —p. 165.
*Familial Cortical Cerebellar Atrophy. B. Hall, K. B. Noad and O. Latham.—p. 178.

Familial Cortical Cerebellar Atrophy.—Hall and his associates discuss the history of a family of 35 persons (four generations) in a number of whom clinical phenomena have developed which generally include extreme ataxia of the lower limbs and difficulties of speech. The difficulties appeared earlier in each generation and progressed slowly to relative helplessness. They were not accompanied by any special sensory disturbances. Relatively late muscular wasting compatible with extreme old age was observed. A postmortem examination of 1 of the patients revealed a remarkably pure form of chronic cortical parenchymatous atrophy of the Purkinje neurons of the cerebellar cortex with secondary involvement of the olivary neurons. The whole picture with its familial and hereditary qualifications resembled Holmes's familial cerebellar atrophy. Seventeen members of the family are children, and so far only 1 of them appears to have been affected at the age of 7. This patient slurs his speech. Of the other 18 members 8 have been affected.

British Journal of Urology, London

13:127-198 (Sept.) 1941

"Essential Hematuria": Are Lesions of Renal Papilla a Frequent Cause? A. Webb-Johnson and W. T. Warwick.—p. 127.
Trigonal Muscle, with Special Reference to Its Composition and Urinary Function. D. Macleod.—p. 135.
*Study of 310 Cases of Enuresis Treated by Urethral Dilation. H. P. Winsbury-White.—p. 149.

Enuresis Treated by Urethral Dilation.—Winsbury-White reports on 310 patients with enuresis whom he examined and treated. In a certain number the condition developed suddenly in connection with an inflammation, generally one of the exanthems. In others the complaint became worse after one of these infections. In about half (49 per cent) enuresis commenced during infancy and in 84 per cent began up to the end of the sixth year of life. Enuresis in both sexes is commonly associated with chronic inflammatory changes in the posterior portion of the urethra and at the neck of the bladder. Chronic inflammatory changes in the urethra in the female often are accompanied by a simple form of vulvitis. In the male these changes are sometimes initiated by inflammation at the external urinary meatus. The urine is generally free from evidence of infection, and no specific organism has been detected to explain the inflammatory changes. In many cases there are mild renal changes indicating some slight impairment of function of the kidneys, as shown by intravenous urography. It is exceptional for patients with enuresis not to be benefited by urethral dilation, provided this treatment is carried out in the proper manner. The author dilates the urethra usually with metal sounds either once or on more than one occasion. He performs the treatment with the aid of general anesthesia. The external genitals are carefully inspected and cleansed. For the male, if deemed necessary, meatotomy is performed next. The caliber of the urethra is estimated; then the cystoscope is passed and the residual urine estimated. Then the dilation is carried out. In treating boys the author uses a special set of curved metal sounds, marked in the French scale from 2 to 26. The treatment should not be attempted by one not experienced in urethral instrumentation in children. The author found that when repeated dilations were necessary benefit did not result when the intervals were extremely short; the shortest interval should be one month. Most of the dilations were carried out at intervals of one to three months. The author thinks that the fact that it has been established that a mild chronic inflammatory process is present in the posterior portion of the urethra and at the neck of the bladder in the majority of cases of enuresis is sufficient justification of treatment by urethral dilation. This treatment has long since proved beneficial in many adults with chronic disturbances of micturition due to inflammatory processes in the same localities. In many such cases the history dates from childhood.

Medical Journal of Australia, Sydney

2:465-496 (Oct. 25) 1941

Air Raid Injuries of Chest. T. F. Rose.—p. 465.
Complement Fixation in Influenza with Embryo Fluid as Antigen. M. Foley and F. M. Burnet.—p. 468.
Biochemical Investigation of Tannic Acid and Sulfanilamide Treatment of Burns. J. de Vidas and A. C. McEachern.—p. 470.
Note on Preparation and Use of M and N Testing Fluids. R. T. Simmons, Lucy M. Bryce, J. J. Graydon and H. Wilson.—p. 474.
Improved Methods of Mental Nursing. S. J. Minogue.—p. 476.

2:497-528 (Nov. 1) 1941

Jaundice. A. J. Collins.—p. 497.
Carcinoma of Colon. T. F. Rose.—p. 501.
Chronic Lymphatic Leukemia After Severe Trauma. J. B. Thiersch. —p. 504.

2:529-554 (Nov. 8) 1941

Hospitals: Historical Survey. F. Arden.—p. 529.
Bacillus Tropicus: New Species Isolated from Man and Animals Described and Compared with Other Bacilli Resembling Bacillus Anthracis. W. G. Heaslip.—p. 536.
Percutaneous Treatment of Vitamin K Deficiency. P. Fantl and A. B. Corkill.—p. 540.

Proceedings of Royal Society of Medicine, London

34:757-834 (Oct.) 1941

Amnesic Syndromes in War. W. Sargant and E. Slater.—p. 757.
Form of Visual Disorientation Resulting from Lesions of Right Cerebral Hemisphere. W. R. Brain.—p. 771.
Clinical Significance of Pattern of Cutaneous Innervation. G. Weddell. —p. 776.
*Use of Vitallium in Surgery, with Special Reference to Cup Arthroplasty. W. H. Cole.—p. 779.
Sulfathiazole in Treatment of War Wounds. J. T. Heyl.—p. 782.
Mechanical Fixation of Fractures. C. H. Bradford.—p. 786.
Orthopedic Aspects of Plastic Surgery: Early Replacement of Skin Losses in War Injuries of Extremities. J. M. Converse.—p. 791.
Osteomalacia: Case. Meave Kenny.—p. 801.
Experience with Intravenous Use of Follicle Stimulating Hormone of Anterior Pituitary in Menstrual Disorders. Meave Kenny and Doreen Daley.—p. 804.
Royal College of Physicians of London, on Occasion of Its Recent Bombing. A. P. Cawadias.—p. 811.
Tuberculosis of Knee Joint. F. C. Golding.—p. 823.

Vitallium in Surgery.—Vitallium appears to be a most inert and "silent" metal in the body. Cole has examined two femoral heads of vitallium and microscopic sections from them. One was from a patient who had been walking for nearly six months with a vitallium femoral cup which became defective and had to be replaced. The other was taken from a patient who died one month after operation; no weight bearing and little motion had taken place owing to the condition of the patient. In neither patient did the author observe the cartilage mentioned by Smith-Petersen, and it is probable that its development depends on a longer use of the hip. The cup in the first patient had to be prized from the neck of the femur, all the motion taking place between the cup and the acetabulum. On removal of the cup a beautifully shaped, smooth, bluish surface was exposed which appeared to be cartilaginous but which was covered by an extremely thin membrane extending in from the capsule. Similar changes were present on the surface of the acetabulum. A block of bone removed from the center of the femoral head when examined microscopically showed no cartilage but merely a thin, dense fibrous layer over compact bone. In the second patient the cup was still loose, and the stump of the neck was rounded and smooth with irregular islands of what appeared to be cartilage scattered over its surface. Microscopically, no cartilage was found and the surface was covered with organizing fibrous tissue overlying the bony trabeculae which showed atrophy near the surface. The vitallium cup is indicated for any arthroplasty of the hip by any method, and for many patients with arthritis and joint deformity for whom arthrodesis or osteotomy is ordinarily indicated.

Annales Pædiatrici, Basel

157:129-192 (No. 3) 1941

*Practical Experiences on So-Called Catarrhal Icterus and Contribution to Its Hematology. E. Ziegler.—p. 129.
Small Epidemic of Pustulosis Varioliformis Acuta. Margrit Esser.—p. 156.
Congenital Pemphigus of Malign Type: Case. O. Brandberg.—p. 162.
*Plasma Phosphatase Titer in Rickets with Particular Reference to Shock Treatment. E. Josefsson.—p. 169.
Determinations of Thyroid Hormone in Connection with "Second Disease" of Scarlet Fever. S. Zimányi.—p. 181.

Catarrhal Icterus and Its Hematology.—Ziegler points out that Flindt in 1890 maintained that the so-called catarrhal icterus is a specific infectious disease. Other authors believed that hepatitis is due not to a specific infection but to an alimentary toxic cause. Icterus simplex, icterus benignus, icterus infectiosus, icterus epidemicus, icterus sporadicus and epidemic hepatitis were some of the terms applied to this entity. The causal organism has never been identified. The author made his investigations on cases of sporadic disease, on small localized epidemics and on a few isolated cases in which the disease originated from endemic foci. His observations indicated that as a rule the disease is transmitted from person to person (probably by droplet infection). From an epidemic in a house in which 5 persons had a manifest and 1 an abortive form of catarrhal icterus the author deduced that the minimal incubation period is twenty-nine days. The prodromal stage is lacking in characteristic symptoms and may be completely overlooked, particularly in adults. In children the prodromal stage often commences with fever and rheumatoid pains in the extremities and the back and throughout the body. At the onset of the stage of generalization central nervous disturbances may develop. When the disease begins with fever catarrhal symptoms of the upper respiratory tract are frequent. Cutaneous changes, in the form of urticaria, may also develop during the prodromal stage. The involvement of the liver is especially characteristic. The demonstration of urobilinogenuria is of differential diagnostic significance if appendicitis is suspected. However, swelling of the liver may occasionally become manifest before the amount of urobilin or urobilinogen in the urine is increased. The author studied the blood picture of 10 patients with fully developed catarrhal icterus and of 5 with the abortive form. He describes the blood picture in the preicteric stage and in abortive catarrhal icterus and discusses the behavior of the sedimentation reaction during the preicteric and the icteric stage. Measurement of the erythrocytes and the determination of the deformation coefficient discloses noticeable macrocytosis without deformation.

Plasma Phosphatase in Rickets.—Josefsson points out that the determination of the phosphatase values constitutes a valuable complement to other investigations in rickets as a criterion of the existence of the disease and to some extent as a gage of its severity. The phosphatase values constitute a more sensitive indicator than the ordinary phosphorus determinations. Phosphatase determinations are superior to blood phosphorus determinations also in estimating the clinical effect of treatment with vitamin D, particularly when it is given as shock (massive dose) treatment. If the phosphatase value is normal before the treatment, later determinations will show little change. If the phosphatase level is moderately increased (up to about 500 units) a reduction immediately after the treatment probably indicates that the disease is mild or moderately severe. But if the value remains high for some time there is reason to assume that the disease is more severe. Really high values, such as 600 units or more, indicate genuine rickets.

Schweizerische medizinische Wochenschrift, Basel

71:1061-1084 (Sept. 13) 1941. **Partial Index**

Clinical Aspects of Chordomas. F. Jenny.—p. 1061.
Lymphemoid Glandular Fever. L. Feil.—p. 1071.
Armored Heart with Backflow Stasis. L. Bischoff.—p. 1074.
Modification of Electric Ejaculation Test. C. A. Joël.—p. 1074.
*Pregnancy After Nephrectomy for Renal Tuberculosis. H. Scherer.—p. 1075.

Pregnancy After Nephrectomy.—Observations on 3 cases of pregnancy after nephrectomy for renal tuberculosis gave Scherer an opportunity to consider this problem from the obstetric-gynecologic point of view. Urologists agree that the removal of one kidney for tuberculosis is not a contraindication to pregnancy, but it has also been pointed out that pregnancy is dangerous as long as some of the clinical signs of tuberculosis are present. The smallest focus of tuberculous infection in the urinary organs may cause a severe relapse during pregnancy. At least three years should have elapsed since the apparent cure of the urinary tuberculosis, and the urine should be free from bacilli, as proved by animal experimentation. Considering the high percentage (60 to 70 per cent) of cure in women who have undergone nephrectomy for tuberculosis, it becomes apparent that pregnancy in these women is not a rarity. The author discusses 3 cases. One death occurred as the result of the pregnancy; in the second case severe nephropathy developed which showed no tendency to subside as late as seven weeks after delivery by cesarean operation; in the third case urinary disturbances led to interruption of the pregnancy after the fifth week. The author does not wish to imply that the presence of only one kidney is an indication for the interruption of pregnancy, but he wishes to direct attention to the danger if the nephrectomy has been done for tuberculosis and a complete cure has not been obtained. He suggests that in some cases, particularly when there are other children and the second kidney is damaged, tubal sterilization might be advisable to prevent further pregnancies and new tuberculous lesions.

Archivos Argentinos de Pediatría, Buenos Aires

16:323-434 (Oct.) 1941. **Partial Index**

*Sulfanilamide in Acute Streptococcic Glomerulonephritis. J. P. Garrahan and C. Ruiz.—p. 323.
*Acute Pleural Empyema Without Fever in Infants. S. I. Bettinotti.—p. 360.

Sulfanilamide in Glomerulonephritis.—Garrahan and Ruiz report on the use of sulfanilamide for a child aged 4½ years with acute streptococcic glomerulonephritis and streptococcic meningitis. The diseases developed one month after acute tonsillitis and otitis media. There were hematuria, arterial hypertension and intractable vomiting. The treatment consisted of intraspinal and intramuscular injections of 5 cc. of a 2 per cent sulfanilamide solution. The injections were given every twelve hours for the first forty-eight hours, during which there was evident improvement. Vomiting disappeared. The amount of urine eliminated in twenty-four hours increased to 400 cc. The urine became normal. The cerebrospinal fluid was sterile, although it was still opalescent. Sulfanilamide was then given by mouth only in daily doses of 1.5 Gm. divided into several doses. It was administered for five consecutive days. Recovery followed without sequels. The authors believe that sulfanilamide is indicated in acute nephritis following infection, provided the urine is eliminated in sufficient quantity. Magnesium sulfate is contraindicated in the course of sulfanilamide therapy.

Acute Pleural Empyema in Infants.—Bettinotti directs attention to a type of acute pleural pneumococcic empyema which develops in infants about one month after pneumonia. There is no fever, but the general condition rapidly declines. The predominant symptoms are dyspnea, toxemia and rapid progressive loss of weight. Clinical and roentgenologic examinations demonstrate a large amount of pleuritic fluid. The course of the disease is grave and complicated. The 3 patients seen by the author were between the ages of 6 and 20 months. Two patients were treated by paracentesis followed by intrapleural lavage with a 5 per cent solution of ethylhydrocupreine hydrochloride. Puncture was performed at intervals of six days up to five and seven punctures, respectively. The patients recovered. In the 3 cases the pneumococcus was the causal agent. The author suggests the name acute pleural pneumococcic empyema without fever for the type of disease described.

Medicina, Mexico, D. F.

21:505-548 (Nov. 25) 1941

*Study of 100 Abnormal Electroencephalograms. R. Vasconcelos.—p. 505.
Vascular Hyperreflexia: Arterial Hypertension as Hyperergic Manifestation in Chronic Infections. T. D. Boquin.—p. 540.

Study of 100 Abnormal Electroencephalograms.—Vasconcelos reports electroencephalographic studies on 100 patients at the General Hospital in Mexico, D. F. The electroencephalograms were obtained mostly from epileptic patients. The records were made in the morning, and, except when the influence of medicines on the electroencephalographic record was to

be studied, the patients were given no sedative, hypnotic, analgesic or anticonvulsive drugs for forty-eight to ninety-six hours before the test. No concordance was found between the form of the epilepsy and the electroencephalographic record as described by Lennox and Gibbs. However, there was a constant direct relationship between the severity of the clinical picture and the abnormalities of the electroencephalogram. The author attempts to classify these abnormalities into three forms: (1) mild epilepsy, "paroxysmal hypersynchrony" of Jasper, or petit mal, (2) moderate epilepsy, the "paroxysmal dysrhythmia" of Lennox and Gibbs, and (3) severe epilepsy, characterized by total or almost total disintegration of the electroencephalogram. Electroencephalographic records were made also for 9 patients with cerebral tumor, for 6 of whom the diagnosis was verified either at operation or at necropsy. Localization was accurate not only for these 6 but probably for the other 3. For 9 patients with craniocerebral trauma the electroencephalogram indicated the location as well as the extent of the lesion. In a patient with occipital hematoma, localization according to Jasper's orientation was accurate. A syphiloma of the temporal lobe and an abscess of the right frontal lobe produced a well defined zone of delta waves. Tests of the remaining patients with organic cerebral diseases all gave electroencephalographic data concordant with the clinical aspects.

Revista Médica Peruana, Lima

13:465-508 (Aug.) 1941. **Partial Index**

*Blood Transfusion in Therapy of Bronchopneumonia in Infants Living in Cities at 3,420 Meters Above Sea Level. J. Arce Larreta.—p. 480.

Blood Transfusion in Bronchopneumonia of Infants.—Arce Larreta treated infants aged 9 to 11 months with bronchopneumonia with transfusions of citrated blood. Transfusions were given into the superior longitudinal sinus daily in amounts of 60 cc. for the first two days and every other day in amounts which varied from 60 to 120 cc. of blood. As many as four additional transfusions were given. The patients were likewise given sulfanilamide, cardiac tonics and oxygen. If the symptoms of intoxication are grave it is advisable to withdraw from the superior longitudinal sinus an amount of blood corresponding to that to be transfused. In all the author's cases a favorable effect was apparent immediately after the first transfusion. It is advisable, however, to continue transfusions until a cure is obtained.

Semana Médica Española, Madrid

4:255-274 (Sept. 20) 1941

Problem of Strabismus. B. Carreras.—p. 255.
Paralytic Talipes: Pathogenesis and Treatment. D. Fernandez Iruegas.—p. 261.
*Adrenal Insufficiency Without Melanoderma. E. Arias Vallejo.—p. 269.
Late Results of Nephrectomy for Renal Tuberculosis: Observations on a Patient Twenty-One Years After Intervention. A. and E. de la Peña.—p. 273.

Adrenal Insufficiency Without Melanoderma.—Arias Vallejo points out that until recently the diagnosis of adrenal insufficiency was based on the characteristic bronzed pigmentation of the skin. Often the sight of thin, asthenic persons with hypotension raised the suspicion of a hypofunction of the adrenals, but when the characteristic melanoderma was not encountered the diagnosis was rejected. Now, thanks to the work of Sergent and the clinical observation of Marañón, it is possible to affirm the existence of adrenal insufficiency in the absence of melanoderma. Such conditions constitute the nonaddisonian or atypical form of addisonism or of hypoadrenalism. Marañón differentiates two groups of nonaddisonian forms of adrenal insufficiency. The first group includes cases of Addison's disease in the phase that precedes pigmentation, and a second group in which pigmentation will never develop. He had observed many cases of adrenal insufficiency without pigmentation; in few, however, did the disease reach the final stage without the occurrence of melanoderma. The author reports the case of a man aged 47 with a family history of pulmonary tuberculosis. His disorder began with persistent anorexia, severe asthenia and emaciation. The blood pressure was low. Hypoglycemia and postinsulinic acidosis were characteristic and led to the diagnosis of adrenal insufficiency, although the patient presented no cutaneous or mucosal pigmentation or the solar pigmentation which is so pronounced in persons with hypoadrenalism. Not being able to obtain either adrenal cortex extract or vitamin C (because of the Spanish war), the patient was put on a diet high in sodium chloride, low in potassium and rich in carbohydrates and fats. On complete rest, administration of epinephrine by mouth and injections of sodium cacodylate, there was some improvement. A pronounced improvement occurred after some adrenal cortex extract had been obtained and administered, but shortly after the patient died. Even at death there was no pigmentation. According to the author adrenal insufficiency is much more frequent in the swarthy complexioned than in the light complexioned (17 to 1 in his own limited material). The disease is frequent in countries in which dark-skinned persons predominate. Clinical signs which permit the diagnosis of adrenal insufficiency in the absence of pigmentation are asthenia, hypotension, persistent anorexia, sexual disturbances (impotence, frigidity, sterility) and loss of weight. The most important functional tests are those which demonstrate hypoglycemia and postinsulinic acidosis. Disturbances in the muscular metabolism are indicated by creatine in the urine, by the decrease in creatinine and by changes in the lactic acid. Disturbances in the sodium-potassium equilibrium are characteristic. The treatment of adrenal insufficiency without melanoderma is the same as that of typical Addison's disease.

Deutsche medizinische Wochenschrift, Leipzig

67:807-830 (July 25) 1941. **Partial Index**

Neurologic Points of View in Estimation and Treatment of Injuries of Peripheral Nerves. P. Vogel.—p. 807.
Increased Frequency of Gastric and Duodenal Ulcers During War? H. Rothe.—p. 810.
*Prognosis of Intermittent Claudication. H. von Hasselbach.—p. 814.
Tolerance for Massive Dose of Vitamin D_2. W. Uhse.—p. 819.
*Dolantin in Recurrent Hiccup. H. Jessen.—p. 821.

Prognosis of Intermittent Claudication.—According to von Hasselbach intermittent claudication is not a disease sui generis but rather a symptom that may result from various vascular diseases, and its prognosis therefore varies with that of the disorder which produces it. Intermittent claudication occurs particularly in arteriosclerosis, whether this is accompanied by diabetes or not, and in the course of endangiitis obliterans. It is an especially frequent symptom of the latter, the author having observed it in 75 per cent of 230 cases. Its appearance may be regarded as the preliminary stage of threatening gangrene. Intermittent claudication is likewise frequent in arteriosclerosis of the extremities. It is usually unilateral at first. During the attack the involved member is pale or cyanotic and cold. Muscular atrophy becomes evident soon after the first manifestation. When intermittent claudication is due to arteriosclerosis the former is so far advanced that hypertension, rigidity of the vessels and signs of general wear are usually evident. The diabetic patient with intermittent claudication has no prospect of being freed from his trouble, because of the existing severe organic vascular changes. There is a tendency to rapid exacerbation. Treatment rarely prevents the development of gangrene for more than several months. The severity of the diabetes is, however, no measure of the extent and course of the vascular involvement. In patients with a slight increase in blood sugar intermittent claudication and rapidly progressing gangrene which cannot be arrested even if the blood sugar is normalized may develop; on the other hand, the improvement in the sugar content of the blood is necessary for the improvement of the vascular disorder. The prognosis of intermittent claudication is somewhat more favorable for the arteriosclerotic patient without diabetes. If the irreparable vascular changes are not too extensive suitable treatment will relieve the trouble for a long time. If local necrosis has developed in a patient with arteriosclerosis the prognosis is unfavorable with regard to the preservation of the member. In endangiitis obliterans intermittent claudication can be favorably influenced for months or even years and the patient may remain free from complaints. However, the evolution of endangiitis obliterans is unpredictable, and intermittent claudication may soon be followed by gangrene. There is no record of a complete cure of endangiitis obliterans, but remissions lasting up to eight years have been known to occur. The ultimate prognosis is unfavorable.

Treatment of Recurrent Hiccup.—Jessen cites several cases from the literature and describes a case of his own in which relapsing hiccup that proved refractory to various mea-

sures was promptly counteracted by the subcutaneous or intravenous injection of the hydrochloride of the ethyl ester of 1-methyl-4-phenyl-piperidine-4-carboxylic acid, also known as dolantin or dolantal.

Deutsches Archiv für klinische Medizin, Berlin

187:353-464 (May) 1941. **Partial Index**

*Significance of Hypoproteinemia in Nontropical Sprue. H. Oettel and S. Thaddea.—p. 353.
Treatment of Flatulence. B. Kemkes.—p. 410.
Atypical Electrocardiographic Pictures of Intraventricular Conduction Disturbance. A. Moll.—p. 415.
Congenital Syphilis in Third Generation: Symptomatology and Clinical Significance: Report of Three Cases. M. Werner.—p. 435.
Nature of Periodic or Cheyne-Stokes Respiration and Its Modification by Oxygen Administration. M. Gukelberger.—p. 443.

Significance of Hypoproteinemia in Nontropical Sprue.—Oettel and Thaddea investigated the problem of protein balance in nontropical sprue. They maintain that reduction of the plasma protein with edema may exist years before the appearance of intestinal disorders; for this reason it is doubtful whether the primary disturbance of sprue is always to be found in the intestine. In only 1 patient did the protein deficiency of the plasma run parallel to the gastrointestinal symptoms. In 2 others protein deficiency of the plasma existed years before sprue symptoms appeared. The combination of adrenal cortex extract and liver preparations is particularly effective in the treatment. Extracts of the anterior pituitary are ineffective. Since results could be obtained with transfusions and with adrenal cortex preparations it can be assumed that the protein formation in the liver and bone marrow is impaired. Disturbances in protein formation as well as in absorption play a part in the pathogenesis of nontropical sprue. The disturbance in the plasma protein formation may be the clinicochemically detectable onset: the vicious circle which follows results in secondary disturbances in the intestinal absorption. The functional impairment of the adrenal cortex, which is likewise secondary, explains such clinical signs as absorption disturbances in pigments, plasma proteins and fats. Nontropical sprue predisposes to hypovitaminosis A. Metabolism, salt and mineral metabolism become secondarily impaired. Relation to incretory glands can be explained by the close relationship between hormones and vitamins. There is so far no proof for the causative role of the hypophysis and the adrenal glands in nontropical sprue. The theory that the disturbance in intestinal absorption is caused by hypoproteinemia and that it develops parallel with other manifestations of failing function (edema, hypocalcemia, nephrosis) is supported by the authors' observations.

Zeitschrift für Orthopädie, Stuttgart

71:289-401 (Jan. 31) 1941. **Partial Index**

*Traumatic Etiology of Torticollis. J. Janěk.—p. 290.
Three Points of Fundamental Importance in Correct Estimation of Skeletal Changes in Congenital Dislocation of Hip Joint. S. Nagura.—p. 295.
Aspects of Antetorsion of Upper End of Femur. S. Nagura and S. Kosuge.—p. 303.
Easy and Rational Method for Reduction of Congenital Dislocation of Hip Joint. E. Kopits.—p. 312.
*Results of Helferich's Arch Shaped Resection in Tuberculous Gonitis of Adults. L. Horeyseck.—p. 317.

Traumatic Origin of Torticollis.—Janěk describes a case of torticollis of traumatic origin in an infant. An operation was performed when the child was 3 months old. The microscopic examination of the removed tissue corroborated the assumption that the lesion had resulted from a birth injury. The clinical course likewise suggested a traumatic origin. The author does not assert that in all cases torticollis is of traumatic origin, but he opposes the assertion that there is no traumatic form of torticollis. The relation between the postnatal development of the tumor of the sternocleidomastoid muscle and the torticollis has not been clearly explained so far. In some cases a large tumor of this muscle is absorbed without subsequent shortening; in other cases even a small, spindle shaped tumor results in considerable shortening and severe torticollis.

Arch Shaped Resection in Tuberculous Gonitis.—Helferich's arch shaped resection was practiced on 25 patients at the orthopedic clinic in Dortmund, according to Horeyseck. The author made follow-up examinations of 22, while from the other 3 information was obtained by letter. The operation resulted in a cure of the gonitis in all cases. The author considers the Helferich arch shaped resection as the method of choice in treatment of tuberculous gonitis of adults. With the exception of hydrops tuberculosus all forms of tuberculous gonitis in adults are indications for the arch shaped resection. Prolonged conservative treatment is of no avail in adults. In König's classification 17 of the 25 patients presented suppurating tuberculous gonitis with destruction of cartilage, ligaments and meniscuses and with foci of infection in bone and abscesses of the soft parts. The other 8 patients had a granulating form of tuberculosis without visible foci in bone but with dense, indurated synovial tissue and with secondary involvement of the cartilage and of the interarticular fibrocartilages.

Zentralblatt für Chirurgie, Leipzig

68:1137-1184 (June 21) 1941. **Partial Index**

*Technic of "Intramedullary Nailing" in Fractures of Lower Leg and of Humerus. G. Küntscher.—p. 1138.
Pseudobursitis Calcarea on Shoulder Joint. H. Debrunner.—p. 1154.
Significance of Cartilage Callus Formation in Etiology and Pathogenesis of So-Called Aseptic Epiphysial Necrosis. S. Nagura.—p. 1156.
*Bone Transplantation in Treatment of Strumiprivous Tetany. I. Turai and R. Robacki.—p. 1159.

"Intramedullary Nailing" in Fractures.—Küntscher describes the technic of intramedullary nailing of fractures of the lower leg and the humerus. This method has been used in more than 100 cases and has proved superior to all other methods. The fragments of bone are so tightly joined by a flanged steel nail introduced into the medullary cavity that other devices, such as plaster or extension bandages, are superfluous. The mobility of the member is not impaired. The nail is V shaped in transverse section and can adapt itself to the varying width of the medullary cavity. The nail should be sufficiently long so that it may extend into each fragment for at least 5 cm. The thickness of the nail must be adapted to the diameter of the medullary cavity. The nail is introduced without exposing the site of the fracture; so there is no danger of an infection in a fresh fracture. Besides a small wound dressing, no bandage is needed. The method is of great value also in osteotomy of old fractures and in pseudarthroses.

Bone Transplantation in Strumiprivous Tetany.—Turai and Robacki discuss various treatments that have been employed in strumiprivous tetany: administration of calcium and dihydrotachysterol, injections of solution of parathyroid, measures that counteract alkalosis, giving vitamin C, ultraviolet irradiation, transplantation of parathyroids, reactivation of the parathyroids by cervical sympathectomy and sinocarotid neurotomy, and particularly transplantation of bone. Milcu's description of a biologic method of assaying the inadequacy of the parathyroids induced the authors to investigate the mode of action of transplantation of bone in strumiprivous tetany. Milcu's biologic assay consists in the visualization of parathyrostimulin (which is produced by the hypophysis) on the parathyroids of rats. Normally, parathyrostimulin does not appear in the urine, but when the parathyroids are inactive it does, and its quantity increases in proportion to the degree of parathyroid insufficiency. The appearance of clear vacuolated cells in the parathyroids of rats signifies a positive reaction. The authors report 2 cases in which they resorted to transplantation of bone into the sheath of the abdominal rectus muscles. Their object was not to demonstrate the therapeutic efficacy of this method but rather to show that the transplanted piece of bone stimulates the activity of the phosphatases. The transplanted bone is a complex of phosphorus and calcium combined with a protein molecule. The organism reacts to it as to a foreign body, it produces specific ferments, phosphatases, which dissolve the phosphorus-calcium complex. The action of the phosphatases is not limited to the site of transplantation; the phosphatase content of the serum increases to twice or three times the normal amount. Thus the transplanted bone acts as a stimulus for the cleavage diastases of the circulating calcium complexes but not as a calcium depot. It had been demonstrated by Lériche and Jong that the daily absorption of calcium from the implanted bone is so small (1 to 4 mg.) that it cannot explain the improvement.

Mitt. a. d. med. Akad. zu Kioto, Kyoto

32:867-1238 (July) 1941. **Partial Index**

*Experimental Study on the Transfusion of Preserved Blood. Y. Nakamura.—p. 867.
*Sugar Content of Preserved Blood. C. Kato and N. Nakahori.—p. 1112.

Transfusion of Preserved Blood.—Nakamura made a series of observations on the properties and effect of citrated rabbit's blood at varying periods of preservation and storage on immunologic reactions following transfusion. He found that the agglutination and bacteriolytic titers, as well as the protective attributes of preserved normal (nonimmune) blood remained unchanged during the first twenty-one days but that thereafter it gradually deteriorated. The opsonic index of the serum is lowered rather rapidly, but the anti O and anti H agglutination titers, the bacteriolytic titers and the protective power of immune blood remain constant during the first twenty-one days of preservation. The opsonic index of the serum diminishes rather slowly. Transfusion of preserved normal blood has a beneficial effect on the production of agglutinins, opsonins and bacteriolysins, there being no effects different from those produced by transfusion of fresh blood. The immune titers and the amounts of transfused blood bear a direct relation to the disappearance time of added immune bodies in the recipient's blood, while the length of preservation is inversely proportional to these reactions. Furthermore, the changes in the anti O agglutinin, opsonin and bacteriolysin resulting from transfusion of immune blood and serum parallel one another; the anti H agglutinin alone tends to disappear much more rapidly than others. The fluctuations in the immunologic reactions produced in the recipient's blood by the transfusion of preserved blood are not appreciably different from those following transfusion of fresh immune blood. The immune bodies in the recipient's blood, as produced by transfusion of preserved immune blood, appear to be more lasting than the immune bodies set up by transfusions of fresh and preserved homologous serum, as well as those resulting from preserved heterologous serum. The effect of transfusion of homologous immune serum is more permanent than that of transfusion of heterologous immune serum.

Sugar Content of Preserved Blood.—Using the picramic method of Seifert, Kato and Nakahori made a series of quantitative determinations on the sugar content of preserved human and rabbit blood which had been kept at 3 to 4 C. (37 to 39 F.). The reducing power of rabbit's blood begins to decrease after forty-eight hours of storage, but some of the samples exhibited no evidence of diminution for as long as two hundred and sixty-four hours. On the other hand, human preserved blood appeared to contain greater glycolytic activity, since in most of the samples the sugar content was found to be less than 30 mg. per hundred cubic centimeters when tested after forty-eight hours of storage. The glycolytic action of preserved blood is due to the ferment present in the formed elements of the blood, and therefore this action is either greatly retarded or entirely abolished when the erythrocytes are hemolyzed by freezing and they are, as sediments, removed from the sample.

Sei-I-Kai Medical Journal, Tokyo

60:582-762 (June) 1941. **Partial Index**

*Studies on Anaphylactic Reaction Caused by Various Milks and Their Protein Fractions. K. Miyata.—p. 684.

Anaphylactic Reactions Due to Milk Proteins.—Miyata reports a series of experiments on the anaphylactic phenomena produced by milk, with special reference to the anaphylactogenic and desensitizing abilities of various types of milk, such as that of the cow, the goat, the rabbit and man, as well as to their protein fractions, particularly casein, albumin and globulin. Guinea pigs sensitized by intraperitoneal injections of the raw milk of man, the cow, the goat or the rabbit exhibited typical anaphylactic reactions in response to the application of each antigen. The results of desensitization experiments in these animals showed that cow and goat milk are closely related, as evidenced by their similar actions; but the milk of the rabbit and of man gave no evidence of any such relationship. Rabbits were sensitized by three intravenous injections of 2 to 3 cc. of whole milk or albumin solution, and the degree of hypersensitization in these animals was tested by reinjection of those antigens which produced changes in blood pressure. As tested by this method, rabbits sensitized to cow's milk were capable of being desensitized by the injection of goat's milk; conversely, sensitization produced by goat's milk could be neutralized by the injection of cow's milk. Here again was demonstrated the mutual relationship between cow's and goat's milk in this particular respect. Desensitization was also detectable in animals sensitized to whole milk when they were tested by the injection of casein and globulin fractions, whereas an albumin solution was found to be ineffective. The precipitin titers of rabbit blood, estimated before and after the observations of blood pressure changes, showed proportionately parallel fluctuations corresponding to the rise or the fall of blood pressure due to the reinjection of the antigens. Absorption tests of precipitins, conducted with immune rabbit serum produced by the same sensitizing agents, further demonstrated the proportionate parallelism between the absorbability of the precipitins and the degree of desensitization.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

81:2053-2120 (Sept. 30) 1941. **Partial Index**

Systematic Campaign Against Trachoma in the Desa (Native Village). R. Kodijat.—p. 2057.
Systematic Campaign Against Trachoma in the Compound. M. Gardjito.—p. 2062.
Some Suggestions in Connection with Combat of Trachoma. S. Hadibroto.—p. 2072.
Scleritis. S. Hadibroto.—p. 2077.
Atropine Poisoning Following Drops in the Eyes in a Child of 8 Months. Que Keng Lead.—p. 2080.
Corneal Fistula. A. W. M. Houwer.—p. 2084.
Transplantation of Conjunctiva (Clinical and Histologic Peculiarities of Cadaver Conjunctiva). Sie Boen Lian.—p. 2097.

81:2121-2176 (Oct. 7) 1941. **Partial Index**

New Salmonella Types in Human Subjects. M. Erber.—p. 2123.
*Therapy of Gastric Hemorrhage. A. van Meeteren.—p. 2147.
Renal Carbuncle and Paranephritis. J. R. von Ronnen.—p. 2155.

Therapy of Gastric Hemorrhage.—Van Meeteren calls attention to Meulengracht's method, which provides generous amounts of food (as much as the patient desires) from the first day of the treatment. Meulengracht's method, although revolutionary, is not entirely new, Lenhartz having advanced a similar one in 1903. The only concession which Meulengracht makes to the hemorrhage is that he gives all foods in puréed form. There are practically no dietetic restrictions, except that foods which can be puréed are given the preference. In addition to the puréed diet the patients are given three times daily a teaspoon of a prescription containing 15 Gm. each of sodium bicarbonate and magnesium subcarbonate, also 2 Gm. of hyoscyamus extract. Patients who have lost much blood are given a blood transfusion. Van Meeteren employed Meulengracht's method in 30 cases. The only medicament he gave in addition was vitamin A (22,000 international units three times daily). On the basis of his observation he recommends Meulengracht's diet. The method excludes the indication for "early operation" in gastric hemorrhage.

Ugeskrift for Læger, Copenhagen

103:1301-1330 (Oct. 9) 1941

Review of Progress in Internal Medicine Since 1896. K. Faber.—p. 1301.
First Aid in Fractures of Jaw. J. Fabricius-Møller and H. Kjaerholm.—p. 1307.
*Therapy in Subacute Bacterial Endocarditis, Especially Significance of Immunotransfusion. R. Friedberg.—p. 1312.

Therapy in Subacute Bacterial Endocarditis.—Friedberg describes a case of subacute bacterial endocarditis in which treatment with sulfanilamide and its derivatives, continued heparin infusions and numerous transfusions of immune blood were without effect. He believes that in the immunization of donors for immunotransfusions considerably larger doses of vaccine should be given than are generally used and that before transfusion heparin should be added to the immune blood.

Book Notices

Physical Medicine: The Employment of Physical Agents for Diagnosis and Therapy. By Frank H. Krusen, M.D., F.A.C.P., Associate Professor of Physical Medicine, the Mayo Foundation, University of Minnesota, Rochester. Cloth. Price, $10. Pp. 846, with 351 illustrations. Philadelphia & London: W. B. Saunders Company, 1941.

Somewhat belatedly comes this review of a book which has already established fully its place in medical practice. In a single volume here are outlined the main branches of physical medicine including the use of heat, light, electricity, water, massage and similar methods, with special chapters on the direct application of these methods to the control of disease, the methods of teaching physical medicine and the use of physical methods in the hospital. The work begins with a fascinating history of the introduction of physical methods which, of course, were among the very earliest used by primitive men. It is a far cry indeed to the present basing of physical methods on actual knowledge of anatomy, physiology and physics, from the empirical use of methods in the natural hot springs of the pre-Christian era. The very large section on heat discusses all the different methods by which heat is employed and will be a revelation particularly to the physician who thinks only of the possibility of heat from a hot water bottle or a diathermy apparatus. The combination, for instance, of heat from a fever cabinet and a chemotherapeutic technic brings about remarkable results in many instances. Most of the conclusions reported by Dr. Krusen are based on personal experience with the methods concerned. Light is given similar consideration, with an introduction indicating the various forms of light that are employed in medicine, the effects of such lights on the physiology of the human body, the indications for use, the contraindications and the results which may be anticipated. With the section on electricity one begins to understand how complicated physical therapy may actually be and how much is required in the way of basic education before such methods are suitably employed. The book proceeds to an excellent discussion of hydrotherapy, the use of massage and exercise and other technics. There is a magnificence of detail which makes every section of the book exceedingly practical. A special chapter on physical therapy in industrial medicine and in military medicine indicates the immediate usefulness of this test for many different purposes. The book has an excellent index.

Communicable Disease Control: A Volume for the Health Officer and Public Health Nurse. By Gaylord W. Anderson, A.B., M.D., Professor and Head of the Department of Preventive Medicine and Public Health, University of Minnesota, Minneapolis, and Margaret G. Arnstein, R.N., M.A., M.P.H., District Supervising Nurse, New York State Department of Health. Cloth. Price, $4.25. Pp. 434. New York: Macmillan Company, 1941.

This volume, which is intended for the health officer and public health nurse, is divided into two parts. Part one discusses historical considerations, the infectious process, control measures, the legal basis of communicable disease control, administrative agencies, role of the public health nurse, care of a communicable disease case at home and epidemiologic investigation of communicable diseases. Part two describes specific measures for the control of typhoid and paratyphoid fever, the dysenteries, hookworm, food poisonings and infections, trichinosis, undulant fever, diphtheria, hemolytic streptococcus infections, whooping cough, measles, chickenpox, German measles, mumps, smallpox, anterior poliomyelitis, meningococcic meningitis, encephalitis, pneumonia, influenza, common colds, tuberculosis, gonorrhea and syphilis, rabies, tetanus, impetigo, pediculosis, scabies and ringworm, and diseases spread through arthropods.

According to the authors this volume has been written principally from the standpoint of the community, and emphasis has been placed on those procedures which are designed to protect the population as a group. However, personal protection has not been neglected. The reader will find a common sense approach to the problem of communicable disease control. Unfortunately, the chapter on historical considerations becomes so highly philosophical in places that interest wavers at the beginning. More facts and fewer generalities would probably receive greater approbation. The same criticism is applicable to the chapter on the infectious process. Further, this second chapter reads as if it were intended for the untrained student; it is written with almost reproachable simplicity. Perhaps it is the attempt to attain simplicity that accounts for two contradictory statements such as "The pathogenic animal parasites, bacteria and viruses do not multiply outside the animal host" and "typhoid bacilli can survive for long periods of time outside the body if in reasonably moist environments that are not too acid; in some cases they can even multiply."

The chapter on control measures is an excellent approach to evaluating and employing the measures that may be used for the control of communicable diseases. The dissertations on the basis of communicable disease control, administrative agencies and role of the public health nurse offer equally interesting possibilities for a better understanding of health maintenance.

While avoiding unnecessary detailed statements, the authors offer sufficient details on the control of specific infections in part two to make this section worthwhile reading for those whom the book was intended for, namely the health officer and the public health nurse.

This book is not intended to supply information on therapeutics; its function is to discuss problems relating to prevention and control measures. Further, the problems of home care, rather than of hospital care, are stressed.

Doctors Mayo. Helen B. Clapesattle. Introduction by Guy Stanton Ford. Cloth. Price, $3.75. Pp. 864, with 64 illustrations. Minneapolis: Univ. Minnesota Press, 1941.

Outstanding among medical biographies of 1941 was this life of two of American medicine's greatest leaders. By this time at least fifty thousand purchasers have indicated their interest in the book. The interest is well justified not only by the orderly combined scientific and historical approach to the subject but also by the quality of the presentation, the excellent illustrations and the detail of the content. This life of the Mayos traces the growth of the men themselves and of the institution to which they devoted their lives from the time when the first Mayo came to the United States in 1845 to the day when the President of the United States himself journeyed to Rochester, Minn., to confer on the Mayos the distinguished service plaque of the American Legion. Perhaps the time is not yet ripe for an analysis of the factors which combine to produce the Mayo Clinic and the Mayo Foundation. Nevertheless, it is not too soon to place on record the details of the lives of Drs. William and Charles Mayo, even if this book was to be only a source book of reference material. The book, however, is far more than that, for each step in the career of the Mayo brothers is considered with relation to the medicine of the times, to the medical attitudes, to public attitudes and similar factors. Almost amazing is the manner in which the author has traced surgical progress as a portion of the lives of the Mayos and made it understandable. Obviously, it is necessary to look into the complexities of medical organization, the effects of medical ethics, indeed the whole history of medicine throughout the world during the period from 1845 to the present. Perhaps the time is actually too soon to understand the extraordinary phenomenon of the Mayo Clinic, but much that is in this book will help to make that phenomenon understandable. The book is replete with anecdotes, with quotations from newspapers as well as from scientific periodicals and with comments by and about many of those who were associated with Drs. William and Charles Mayo in developing their work. Here indeed is a work well able to stand beside other important biographies like the Vallery-Radot "Life of Pasteur" and the Cushing "Life of Sir William Osler."

Die Goldbehandlung der chronischen Arthritis unter besonderer Berücksichtigung der Komplikationen. Von Fredrik Sundelin. Acta medica Scandinavica, Supplementum CXVII. Paper. Pp. 291, with 19 illustrations. Lund: Håkan Ohlssons Boktryckeri, 1941.

Use of gold salts in treatment of rheumatoid arthritis is slowly gaining some favor in the United States even among rheumatism specialists of broad experience, but with this increasing use of gold have come repeated reports of serious, and occasionally of fatal, toxic reactions. Whether results obtainable with this form of treatment justify the risks involved is not yet known with certainty. However, gold therapy will unquestionably be given extensive trial, and Sundelin's monograph, which reviews

the question of gold toxicity with considerable thoroughness, will be found increasingly useful to workers in this field. The volume is divided into two sections, the first devoted to a critical review of the literature on gold therapy and the second outlining the author's experiences with gold toxicity at the Nynas Kuranstalt, where gold was used in the treatment of 730 arthritic patients during the years 1934 to 1940. The first section probably represents the most extensive and most useful historical survey of gold therapy thus far published. It includes material on the origin of gold therapy, on pharmacology and on reported results of gold therapy, and a careful analysis of the literature relating to toxic reactions. The second section, which details observations at the author's clinic, would have been strengthened by distinguishing the types of arthritis under consideration, but the relevant material is presented without regard to this classification. Nevertheless the report contains important data. Details are presented of the toxic reactions as they affect various systems, and a fair statement of the present knowledge regarding therapy of these complications is presented. This monograph should be known to every rheumatologist who undertakes gold therapy for arthritis.

About Ourselves: A Survey of Human Nature from the Zoological Viewpoint. By James G. Needham. Cloth. Price, $3. Pp. 276, with illustrations by William D. Sargent. Lancaster, Pa.: Jaques Cattell Press, 1941.

This is an effort to orient the reader in human nature from the zoologic point of view. The first part deals with man in his biologic aspects and the second with society in its biologic aspects. In part I there are chapters dealing with man's place in the living world, with the group of primates, with man's remote ancestry and the development of the nervous system, the brain, behavior, instinct and learning. This part of the book closes with chapters dealing with infancy and with nature and nurture in the human species. In developing these subjects the author cites examples to indicate the various levels of zoologic development and draws comparisons between them. In so doing he perhaps tends to assume that the average well educated though nonscientific reader has more basic knowledge of anatomy, physiology and biology than is actually the case. Nevertheless, with the exception of a few passages, the book should be quite intelligible at the college level.

In part II the author develops his conceptions of the biologic aspects of society with respect to quality and numbers of population, with social vs. the biologic inheritance, the components of social behavior, the role of instinct in human affairs, the chief products of the "folkways" and two chapters each relating to war and to government. He closes his chapter on government in the following words:

> Government is our chief instrument of cooperation. It is the only one in which we all act together and which we all support. In other organizations, fraternal, educational, social, religious or what not, we go our several ways and are divided into competing groups. To our government we look first of all for defense and for a measure of public guidance. To it we yield obedience and independence of action. Under it we assume responsibility toward others. By means of government we make common cause of our common needs, with all the other citizens of our national group. The reason for this is force (the President of the United States is first of all Commander in Chief of the Army and Navy [Constitution of the United States, art. III, section II, paragraph I]). Government begins and ends in force.

The book closes with a chapter on religion, which is so general that it probably will satisfy few readers. Taken as a whole, it is a fine, scholarly presentation of the place of man in relation to nature as conceived in the terms of the evolutionary hypothesis.

Electrocardiography Including an Atlas of Electrocardiograms. By Louis N. Katz, A.B., M.D., Director of Cardiovascular Research, Michael Reese Hospital, Chicago. Fabrikoid. Price, $10. Pp. 580, with 806 electrocardiograms. Philadelphia: Lea & Febiger, 1941.

In spite of the numerous new textbooks on electrocardiography which have appeared recently, another comprehensive and lucid presentation of this important adjuvant to internal medicine is welcome. The author, one of the recognized leaders in the field of cardiography, submits a most complete and inclusive volume. The material has been divided into three parts. The first deals essentially with the theory, fundamental concepts and genesis of the electrocardiogram. The author has also utilized this section to present his own views on the origin of electric currents in the heart and to point out certain inherent errors in applying the concept of the Einthoven triangle for the determination of the electrical axis. Section two includes a systematic presentation of the normal and abnormal variations of the components of the electrocardiogram. The electrocardiographic changes encountered in acute rheumatic fever and diphtheria and those following digitalis are adequately discussed. The major part, however, is devoted to the position of the electrocardiogram in coronary disease. The author has here attempted, and incidentally succeeded admirably, in presenting the various changes following coronary insufficiency on a physiologic basis. By so doing he has shown how the electrocardiogram is a pictorial representation not of anatomic changes in the heart but of fluctuation in the amount of blood being supplied the heart by way of the coronaries at specific time intervals. This entire concept is extremely important and its utilization in clinical practice makes for a clear understanding of the diagnosis, prognosis and therapeusis of coronary artery disease. The section closes with a complete discussion and presentation of the various electrocardiographic contours encountered in chronic diseases, such as congenital, chronic rheumatic, syphilitic heart disease, chronic cor pulmonale, hypertension and vitamin B deficiency states. One statement in this chapter with which the reviewer takes exception is noted on page 276; namely, that in hyperthyroidism "the large amplitude T waves . . . are relatively uncommon . . . more common . . . are small T waves. The final section is devoted to a complete and thorough description of electrocardiographic manifestations of the cardiac arrhythmias. Major attention is devoted to the more common varieties, but adequate description of the more uncommon types, such as parasystole, reentry, reciprocal and pseudoreciprocal rhythm, are included. The text itself is well written, profusely illustrated and with extremely detailed legends.

The Advancing Front of Medicine. By George W. Gray. Cloth. Price, $3. Pp. 425. New York & London: Whittlesey House, McGraw-Hill Book Company, Inc., 1941.

Here is as fine a collection of scientific essays, written especially for the public, as has been gathered together under one cover by any publisher in our modern times. The statement may seem strong, but it is warranted by the quality of Gray's contribution. He does not overdramatize. He has made certain of his scientific medical sources. He tells his story in a straightforward way. His book is informative for the public and will be equally informative to a great many physicians who wish to have in brief, easily readable form much of the recent advance in medical science. The subjects particularly concerned include the nature of disease, the new work on the blood and on blood pressure, sulfanilamide, influenza, allergy, the encephalograph, cancer and age. The book is supplemented by an excellent bibliography and index. It reflects adequately the manner in which modern medicine advances by encouraging all the fundamental discoveries in the basic sciences. As a contributor to *Harper's Magazine*, the *Atlantic Monthly* and the *Reader's Digest*, Mr. Gray has had recognition by leading literary publications. His book gives current news of scientific research as a scientist would wish to have such news given.

Exercises in Electrocardiographic Interpretation. By Louis N. Katz, A.B. M.D., Director of Cardiovascular Research, Michael Reese Hospital, Chicago. Fabrikoid. Price, $5. Pp. 222, with 189 electrocardiograms. Philadelphia: Lea & Febiger, 1941.

This companion volume to "Electrocardiography" consists essentially of the presentation of 90 case reports. The author systematically and objectively first describes the electrocardiogram. He then interprets the curve. A brief clinical history follows, after which both clinical story and electrocardiogram are correlated. The cases are well chosen and represent the more common electrocardiograms to be encountered. If any fault is to be found, it lies in the format of the text. The reviewer feels that the value of the text would be somewhat enhanced had the cases presented been sectionally grouped as normal and abnormal, and the latter then further subdivided into infarction, preponderance, arrhythmias, and so on. This, however, in no way detracts from a book the careful perusal of which will more than repay the reader by furnishing a clearer concept of the relationship of electrocardiography to clinical medicine.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

THERAPY OF HOOKWORM INFECTION

To the Editor:—**Will you kindly inform me as to the drug of choice in the treatment of hookworm disease, with recommended doses in both adults and children; what toxic effects might be anticipated from the use of these drugs?**

E. W. Furgurson, M.D., Plymouth, N.C.

ANSWER.—The drug of choice in hookworm disease is hexylresorcinol, which can be obtained only in the form of caprokol pills, which are designed for stability of the drug and to prevent crushing in the mouth. The dose is 1 Gm. for an adult and correspondingly smaller doses for children. The pills must not be chewed, as hexylresorcinol is irritating to the mucous membranes of the mouth. The drug should be taken on an empty stomach in the morning and followed by a glass of water. Breakfast should be omitted and no food taken until lunch time. This allows reaction of the drug with the worms rather than with food.

Hexylresorcinol in a single dose will remove 80 to 100 per cent of the parasites without danger and may be repeated in two days. If ascarids should be present, the drug will remove practically all of these parasites without complications.

Tetrachlorethylene is even more effective. It may cause some dizziness and rarelv if ever any toxic symptoms. If ascarids are present it should be avoided, as it may cause migrations of these parasites and severe complications. Treatment should be carried out in the morning, and breakfast must be omitted. The usual adult dose of tetrachlorethylene is 3 cc. Children may be given 0.2 cc. for each year of age up to 15 years. The drug should be given in a single dose in either of the following ways:

1. A purgative of magnesium sulfate should be dissolved in half a glass of water and the liquid tetrachlorethylene added to this and the whole shaken up and swallowed at one time. Any of the drug adhering to the glass should be rinsed off with additional water and taken.

2. Tetrachlorethylene may be given in hard gelatin capsules followed at once by the magnesium sulfate purge. The patient should rest and wait until the purge acts before eating. In some cases a second purge may be necessary to produce a bowel movement.

DISTURBED MEMORY AFTER PHENYTOIN

To the Editor:—**A woman aged 21, who has had a history of epilepsy, has been on phenytoin sodium for about seven months. During the past month she has been feeling that something has begun to disturb her memory. She confuses people and things and can't remember easy lessons. She is at the point where she wonders if she should stay in school. Have you any data on possible ulterior reactions from phenytoin sodium and if these symptoms are suggestive of it?**

William B. Brown, M.D., Columbia, Mo.

ANSWER.—In an epileptic woman of 21 years it would not be reasonable to attribute mental confusion or loss of memory entirely to the medication used in treatment. However, in this case there is a strong suspicion that phenytoin sodium is responsible. Merritt and Putnam in their original report on 200 patients treated from three weeks to eleven months stated that ". . . toxic reactions, tremors, ataxia, dizziness and the like [occurred] in approximately 15 per cent" (THE JOURNAL, Sept. 17, 1938, p. 1068). Kimball reported "dizziness and a staggering gait" (*ibid.* April 1, 1939, p. 1244). The Council on Pharmacy and Chemistry reported that "Various side actions of different degrees of severity which have been observed include dizziness, dry skin, dermatitis, rash, itching, tremors, fever, nausea, vomiting, blurred vision, fatigue, apathy, difficult breathing and swallowing, nervousness, mental confusion and active hallucinations . . ." (*ibid.* Nov. 4, 1939, p. 1734). Blair and his co-workers found that detrimental effects may occur with the use of the drug and warned that, when a patient's mental condition appeared worse, chronic poisoning should be suspected (*Lancet* **2**:363 [Aug. 12] 1939). Weaver and his co-workers reported that 6 patients were extremely drowsy for from two to six weeks after medication, 3 patients had profound psychic distress and 3 had severe and persistent headaches (*Virginia M. Month.* **66**:522 [Sept.] 1939). Williams reported that toxic symptoms developed in 36 per cent of the patients treated with this drug, and 2 died in status epilepticus (*Lancet* **2**:678 [Sept. 23] 1939). Davidson and Sutherland treated 12 patients suffering from epilepsy with mental symptoms (psychotic behavior). They reported that the most prominent result was the appearance of toxic effects. These included headache, nausea, giddiness, loss of appetite and ataxia. Only 1 patient showed mental improvement. The authors advised that the drug should not be used more than a few weeks at a time (*Brit. M. J.* **2**:720 [Oct. 7] 1939). Black feels that diphenyl hydantoinate should be used only for patients who do not respond to treatments which are less toxic (*Psychiat. Quart.* **13**:711 [Oct.] 1939).

Obviously, phenytoin sodium (dilantin sodium) is not as effective or as harmless a drug as the circulars so frequently insist. In children and in petit mal epilepsy the drug is of little value. Certainly it does not replace the well established and relatively harmless phenobarbital as the first and least expensive treatment of choice.

ASTHENIA AND ACHING WITH GAIN IN WEIGHT

To the Editor:—**A married woman aged 62, for many years a practical nurse, has (1) weakness, (2) aching and "burning" in all extremities, (3) anorexia and (4) a gain in weight of 20 pounds (9 Kg.). Thirty years ago she underwent a pelvic operation (removal of a uterine tumor, oophorectomy?) after which menstruation stopped; no symptoms of surgical menopause are remembered. She had had two normal pregnancies previously. Her health had always been good until one and one-half years ago, at which time she had influenzal symptoms (onset with severe sweating, fever for five days, aching in the extremities, weakness and loss of a usually good appetite). Her present symptoms all date from that time. The aching in the shoulders and legs will wake her at night, especially after the patient has been tired. The asthenia may be present at any time, often being present when she arises. It is unrelieved by rest. She is restless and nervous. She states that she cannot relax and sleeps poorly. She has had a gain in weight from 120 pounds (54 Kg.) to 140 (63 Kg.), despite a low food intake (consisting of small servings of vegetables and fruit, rare meat, eggs and little carbohydrate). Her breasts have definitely become enlarged in the last year; formerly her breasts were not developed. Occasionally mild pyrexia is present (the temperature being 99 to 99.6 F.). Agglutination tests give negative results. There is no enlargement of the thyroid. The physical examination gives negative results except for slight pitting edema of the ankles. A small uterus is palpable; the adnexa are normal. The urine contained no albumin or sugar on three occasions; the specific gravity is between 1.014 and 1.017 on twelve hour concentration tests. The hemoglobin content is 80 per cent. The red blood corpuscles number 4,100,000 and the white blood corpuscles 7,800. The Wassermann reaction is negative. The basal metabolic rate is 0. The blood pressure is 130 systolic and 84 diastolic. Injections of the vitamin B complex are being given.**

R. L. Gorrell, M.D., Clarion, Iowa.

ANSWER.—There is nothing tangible in the clinical picture. It seems unlikely that there can be any connection between the operation of thirty years ago and the present symptoms. Too long a time has elapsed. Any so-called wasting disease seems ruled out by the gain in weight on a low calory diet. The mild pyrexia seems relatively unimportant for the same reason. Has undulant fever been ruled out?

A glandular dysfunction seems the most reasonable explanation. A pituitary disturbance is suggested by the enlargement of the breasts and the gain in weight. It might be worth while to determine the sugar tolerance and map the visual fields. It seems doubtful that a roentgenogram would show anything abnormal.

The fact that the aching and the asthenia followed an acute infection suggests the presence of chronic fibrositis or myositis. This diagnosis does not fit in well with the gain in weight, but the possibility is worth considering.

Has the circulation in the extremities been investigated? An arteritis such as Buerger's disease would seem to fall within the range of possibilities.

An adrenal deficiency should also be considered. If it is impossible to establish the diagnosis it might be worth while to administer one of the adrenal cortex hormones in a therapeutic trial. All of this is grasping at straws and is most unsatisfactory medical practice.

PILOCARPINE AND PHYSOSTIGMINE FOR GLAUCOMA

To the Editor:—**Would the continuous use of pilocarpine hydrochloride or physostigmine (eserine) sulfate for a period of ten years in the eye cause a cloudiness of vision or a conjunctivitis? Which do you consider the more harmless of the two for long use in a case of glaucoma? Is there any other medication that could be used to relieve the tension within the eye in a case of chronic glaucoma?**

Sidney Scheinman, M.D., New York.

ANSWER.—Any drug instilled into the conjunctival sac over a long period of time is apt to produce conjunctivitis medicamentosa, which at its greatest severity may simulate trachoma. If allowed to persist, disturbances in the corneal epithelium may result with consequent decrease of vision. Furthermore, for some persons the use of a solution of pilocarpine or physostig-

mine that is too strong and that is used too frequently starts a marked irritation of the iris and anterior uvea with resultant posterior adhesions, lens opacities and vitreous deposits. Withdrawal of the offending drug, the use of a bland eyewash and the instillation of 1:1,000 epinephrine hydrochloride solution several times daily is sufficient to relieve conjunctivitis medicamentosa.

For long continued use in a case of chronic glaucoma, pilocarpine is far preferable to physostigmine. When chronic glaucoma requires physostigmine to control the tension, that case passes from the medical to the surgical category, except when an idiosyncrasy toward pilocarpine is present. Then weak physostigmine solutions may be used. If both of these drugs produce conjunctival irritation, recourse may be had to 2 per cent Doryl in 1:3,000 solution. Favorable reports about this drug were made recently by O'Brien of Iowa City. It has not yet been submitted for consideration by the Council on Pharmacy and Chemistry.

Fully fifty years ago, Hirschberg showed that the irritating effects of pilocarpine solutions were due either to a transformation into jaborandi or to a bacterial contamination of the solution. The former is of rare occurrence, but the majority of patients contaminate their pilocarpine solutions from the tip of the dropper. When the solution is to be used over a long period of time, it is well to instruct the patient to strain it through fine linen every two weeks and to sterilize the opened bottle in a double boiler.

VICARIOUS HEMORRHAGE?

To the Editor:—**Is there such a thing as vicarious hemorrhage? I do not refer to a nasal hemorrhage, one that is an effort of nature to relieve a natural but suppressed function, such as menstruation. The hemorrhage I refer to may occur as a result of cessation of prolonged bleeding in one part of the body recurring, after months, in another part.**

H. S. Jones, M.D., Kansas City, Mo.

ANSWER.—Vicarious hemorrhage in the sense implied in the question does not exist or is extremely rare. The term should be applied only to hemorrhage from mucous membranes (due to diapedesis of red cells) that occurs in the suppression of normal menstruation.

When cessation of prolonged bleeding in one site is followed by a recurrence in another site there is practically always an underlying constitutional cause for the bleeding, such as thrombocytopenic purpura, Schönlein-Henoch disease, hemophilia, familial telangiectasis or another blood dyscrasia; or there may be a local cause for the bleeding, such as increased capillary or venous pressure, as occurs in hemorrhage from esophageal and hemorrhoidal varices in portal hypertension, nasal hemorrhage in systemic hypertension or pulmonary hemorrhage in rheumatic heart disease. In the former constitutional diseases hemorrhage may occur from only one part of the body for months or years, to be replaced by hemorrhage in another part. Periods of remission are also common, with complete cessation of bleeding for many months, followed by recurrence in the same or in another site. It is extremely unlikely that suppression of hemorrhage from one site will by itself result in hemorrhage from another site. This applies particularly to the example presented, in which a period of months elapsed before the hemorrhage recurred. It is highly probable that the recurrence of a hemorrhage in another part of the body would result from the same blood dyscrasia or abnormality in capillary walls which caused the original hemorrhage and would be in no way related to the cessation of bleeding in the original site.

In hemorrhage due to increased intravascular pressure, the site of bleeding depends on the point least resistance to the increased tension. Removal of one source of bleeding does not predispose to or precipitate bleeding at another site.

OILY SOLUTIONS FOR INTRATRACHEAL INJECTIONS

To the Editor:—**With reference to injection of iodized oil into the lungs, for many years in bronchial conditions I have been using tracheal injections of about 1 to 2 cc. of mono-p-chlorophenol solution (Pilling) and also camphor menthol in liquid petrolatum. Are these injections contraindicated according to later findings?**

Joseph Halton, M.D., Sarasota, Fla.

ANSWER.—According to recent investigations, the use of liquid petrolatum as a vehicle for intratracheal injections of camphor or menthol is contraindicated. Liquid petrolatum, when used over a moderate period of time, may produce a chronic form of lipid pneumonia which progresses to an abundant fibrosis or even to the formation of pulmonary oil tumors (paraffinomas). Mono-p-chlorophenol, a phenol derivative, is likewise usually used with liquid petrolatum as a vehicle, and consequently the same objection holds. However, it has recently been placed on the market with a vegetable oil (sesame oil) in place of the liquid petrolatum to overcome this objection. Vegetable oils, chemically saturated, apparently have little effect on the bronchial mucosa or the alveolar system. Lipiodol (poppyseed oil saturated with iodine) is such an oil and is relatively nonirritating in this respect.

PROBLEM OF SYPHILIS AND GONORRHEA IN MAID

To the Editor:—**A patient has a Negro maid aged 19 who on examination for a vague abdominal complaint gave a 4 plus Wassermann reaction as well as a profuse vaginal discharge which on smear showed many gram-positive and gram-negative cocci and bacilli and many pus cells but no intracellular cocci. The girl is single and admits sexual contact but denies that she has had a chancre or any apparent secondary manifestation. The rest of the examination gives negative results regarding congenital stigmas, mucous patches and the like. Antisyphilitic treatment has been begun, but how should the mistress be advised? The family has two children, a girl aged 2 and a boy aged 10. Should the maid be allowed to work in the house? There is no separate maid's bathroom. If so, what precautions should be taken and how should the discharge be treated—with sulfathiazole or what?**

M.D., New York.

ANSWER.—The question of immediate importance as far as the employment of the patient described is concerned lies in the tentative diagnosis of gonorrhea. On the basis of the information supplied, this diagnosis cannot be made with certainty. The bacteriologic diagnosis of gonorrhea in women cannot be satisfactorily made by means of smears but demands instead the use of culture. Culture should always be performed if the data on the smear are not corroborated by the history and by physical examination. The diagnosis of gonorrhea in women should be based on the following points: (1) a history of the symptoms of dysuria, vaginal discharge, vulvar pruritus, pelvic inflammation or acute arthritis and of exposure to a person known to have gonorrhea; (2) clinical examination, especially abdominal, pelvic and rectal; (3) Gram staining of secretions from the urethra, the glands of Bartholin, the cervix and the rectum, with the precautionary observation that the normal genital flora may contain organisms which closely resemble gonococci, and (4) culture, which should always be performed if the data on the smear are not corroborated by history and physical examination.

If the diagnosis of gonorrhea is certain, the patient should, of course, be temporarily laid off from work which involves such intimate contact with children until she has been adequately treated. Likewise, if the diagnosis of gonorrhea is still uncertain at the time this inquiry is answered it would be desirable to separate her temporarily from her work until the absence of gonorrhea has been demonstrated by culture.

As to treatment of gonorrheal infection, in the acute stages local treatment is unnecessary except for the maintenance of external cleanliness, and douches should not be used. If the patient has acute pelvic inflammatory disease she should be put at bed rest with ice bags applied to the abdomen, the bowels should be kept open by saline catharsis, enemas being avoided, and hot cleansing douches may be used.

For chemotherapy, sulfathiazole is the drug of choice. On the first day a total of 3 Gm. may be given, in six divided doses of 0.5 Gm. each, every three hours from 6 a. m. to 9 p. m. From the second to the ninth day inclusive the dose may be reduced to a daily total of 2 Gm., 0.5 Gm. being given every five hours from 6 a. m. to 9 p. m. On the tenth day if the patient is symptom free all treatment may be stopped.

The determination of cure of gonorrhea in women demands the use of cultures of material taken from the urethra and the cervix at monthly intervals, preferably on the last day of the menstrual period.

As to syphilis, although the patient shows no obvious lesions of this disease it may be safely assumed that because of her age she has been relatively recently infected, and she may therefore be regarded as potentially if not actually infectious. She should be treated as if the diagnosis of early syphilis were certain, the physician following the outline proposed by the Cooperative Clinical Group of continuous treatment over fifteen to eighteen months with alternating courses of a trivalent arsenical and of a bismuth compound. These drugs may be safely given concurrently with sulfathiazole without risk of increased reactions from either group of drugs.

Both as to syphilis and as to gonorrhea it would be desirable for the patient to be withdrawn from the intimate personal contact of her present occupation for at least two weeks after the initiation of treatment. However, the girl's employer should be told only that the patient has an infectious disease, and the names of the diseases gonorrhea and syphilis should not be used without the patient's consent.

At the end of two weeks' treatment with sulfathiazole for gonorrhea and with a trivalent arsenical for syphilis it may be safely assumed that the danger of household contact is practically past and the patient may be allowed to resume her occupation.

THREATENED AND INEVITABLE ABORTION

To the Editor:—In cases of abortion in which there is dilatation of the os, a history of bleeding and clinical and laboratory evidence of bleeding but no certainty that the fetus has been expelled, may curettage be done? Three times in the past two years patients have been brought to the operating room for the removal of retained secundines, and, contrary to the belief of all concerned, it was found that the fetus had not been expelled. If the conditions mentioned have been present and there has been careful observation of the patient for some time, would any one be at fault? Would a certain amount of dilatation of the os be considered sufficient evidence that expulsion of the fetus had taken place before admission to the hospital? If so, what would that amount of dilatation be? How can one be certain that the fetus is expelled or is no longer alive?

M.D., Washington, D. C.

ANSWER.—It is difficult and at times impossible to determine when an abortion ceases to be threatening and becomes inevitable or incomplete. In some instances pregnancy will continue in spite of a long period of moderate bleeding. As a rule, however, when bleeding begins in the first trimester of pregnancy and continues longer than a week in spite of the patient being kept at rest, one can assume that the abortion has become inevitable. The prolongation of conservative management may only postpone the inevitable end. In the majority of the patients who threaten to abort, serious damage incompatible with a continuation of the pregnancy has occurred prior to the onset of bleeding. Some dilatation of the cervical canal is present with the inevitable abortion, but cervical dilatation alone may not be sufficient evidence to establish the status of the abortion. Moderate or profuse bleeding and the passage of clots are as significant as dilatation of the cervix. The fact that the fetus is still in the uterine cavity in the presence of considerable bleeding and cervical dilatation is no proof that the pregnancy could have continued successfully. Oftentimes the fetus is dead or abnormal and the pathologic changes which initiate the abortion are in the chorion. The Aschheim-Zondek and Friedman reactions become negative six or eight days after fetal death. Pregnandiol determinations show a rapid decrease to a low level immediately after fetal death. Neither of these laboratory methods is often resorted to clinically.

POSSIBLE SPINAL CORD NEOPLASM

To the Editor:—A man aged 75, formerly an iron worker, began six years ago to have a steadily increasing pain in the left hand. About seven years ago he had intense itching of the left scapular region that required constant scratching to obtain relief. This gradually subsided and was followed by occasional feelings of numbness in the thumb, index finger and radial half of the middle finger of the left hand. Soon this numbness, inconstant at first, was accompanied by a general aching type of pain in the whole hand that appeared in attacks lasting several weeks, with intervals of several weeks of relief from pain. These attacks always occur shortly (one to two hours) after the patient goes to sleep, never when he is standing and awake, except when he sits in a low chair for any length of time. Relief is obtained by arising and by massaging and exercising his fingers. He then can lie down for a few more hours. Lately the pain has become more severe, accompanied by a feeling of stiffness and slight edema. Change in weather and strong exertion seem to make the night pain more severe. Recently the same condition, has appeared in the right hand, but when it does he is apparently less troubled with the left. He is a well preserved man; he is moderately stooped, weighs 188 pounds (85 Kg.) and has a blood pressure of 126 systolic and 80 diastolic. The Wassermann reaction is negative. The heart, lungs and abdomen show no abnormalities. Roentgen examination of the shoulder and the upper part of the spine show hypertrophic osteoarthritis with lipping and excrescence between the vertebrae; there is no evidence of a cervical rib. The blood vessels are soft and pliable, with no evidence of arteriosclerosis; radial pulses are equal and regular. There is definite anesthesia to a pinprick and to heat and cold in the involved fingers. Treatment has been difficult to evaluate because of the periods of remission of pain. Diathermy appears to be most beneficial, although most of the treatments suggested for acroparesthesia, hypertrophic osteoarthritis, neuritis, and the like, including roentgen therapy to the hand and the dorsal spine, have been tried with little if any relief. At one clinic the condition was diagnosed causalgia of the median nerve and possibly radiculitis and cervical spondylitis. Injection of procaine in oil into the nerve was of temporary benefit. An opinion of this case, with suggestions as to methods of treatment to give the patient relief, so that he may sleep at night, will be greatly appreciated.

David Soloway, M.D., Valley Stream, L. I., N. Y.

ANSWER.—This patient needs a careful manometric study of the spinal fluid to determine the presence or absence of a spinal block and the total protein content. The history is suggestive of a neoplasm of the spinal cord. Three other conditions suggest themselves: they are root pain secondary to spondylitis, osteoarthritis and syringomyelia. If a tumor is present neurosurgical exploration is indicated so that the tumor may be removed if possible. For the root pain of spondylitis, posterior section of the involved roots is indicated. Bilateral section of the third, fourth, fifth, sixth and seventh cervical roots should be done. If syringomyelia is considered, the suggested treatment is drainage of the myelic cavity.

PERIODIC EXFOLIATION OF SKIN

To the Editor:—A youth aged 18, whose past history is irrelevant concerning any acute or chronic illnesses with exception of the usual childhood diseases has a severe exfoliation of the skin of both the anterior and posterior surface of the hands and feet which has developed once a year about the same time for the last five years. Shortly preceding this exfoliation there is a hyposthesia of epicritic sensation resembling that of peripheral neuritis. The skin then desquamates. Large casts of skin and cornified epithelium peel off almost like a glove. Occasionally this is accompanied by multiple furunculosis and small abscess formation in the subcutaneous tissues, necessitating incision and drainage. Regional adenopathy is present, probably due to secondary infection. The usual course of the desquamation is that it is free from pain and infection. Following the sloughing off of the thickened epithelium, a skin of normal texture is rapidly assumed and no further trouble is experienced until the following summer. The blood Wassermann reaction is negative, and urinary and blood counts are irrelevant. There is no evidence of trophic neurologic lesions, and no spina bifida is present. The course of the disease might be summarized as beginning more or less like a simple peripheral neuritis, followed by the desquamation of the skin. The curious thing about this is the yearly occurrence: the condition has been present now for five summers. I am wondering what suggestions you might make concerning a definite diagnosis, as I have never before seen anything exactly like it.

M.D., Ohio.

ANSWER.—It would be of interest to know more about the prodromal manifestations of these attacks. Comment is made of hyperesthesia, but nothing is said about erythema or vesiculation or any change in the skin itself previous to exfoliation. In the next to the last sentence there is an insinuation that this occurs in the summertime. The seasonal incidence is of interest but aids little in the diagnosis. The symmetrical involvement of the distal portions of the hands and feet suggests a toxic affair, but the description given does not agree with the usual manifestations of erythema multiforme, which frequently occurs in the spring of the year, involving the hands and occasionally the mouth or feet. The multiple abscesses are undoubtedly secondary infection and are only a complication of the original cutaneous condition. A definite diagnosis cannot be made on the information given. Further details of the onset would be of interest.

The suggestion is made, if the condition has occurred in approximately the same month each year, that a course of calcium, either as lactate or gluconate, for a period of six to eight weeks previous to the usual onset might be tried out.

SEVERE INTERMENSTRUAL PAIN

To the Editor:—An unmarried white woman aged 31 for the past eight years has had recurrent attacks of pain in the lower part of the abdomen. These attacks at first came on infrequently but now occur regularly midway between her periods. They come on suddenly and for the first twelve hours are severe, being essentially gone within twenty-four hours. Physical examination during and between attacks gives essentially negative results, except for moderate tenderness in the abdomen more distinct in the pelvic vaults. During the attack the white blood cell count rises, having been 16,000 on at least one occasion. I assume that this is mittelschmerz but have never seen it so severe. Have you any suggestions as to therapy?

Franklin K. Paddock, M.D., Pittsfield, Mass.

ANSWER.—It is well recognized that the pain associated with ovulation is sometimes severe. It is known to have been responsible for mistaken diagnoses of acute appendicitis or ruptured ectopic pregnancy; as a result, unnecessary operations have been performed. In most cases only symptomatic treatment is justifiable. This consists of giving anodynes such as acetylsalicylic acid and codeine in sufficient doses and the application of heat to the abdomen. In some cases avoidance of activity and rest in bed are helpful during the fastigium of the ordeal. Intermenstrual pain or mittelschmerz frequently ceases spontaneously without any therapy. Since this is not always true, the physician should keep in mind that whatever treatment is adopted may have to be repeated over a long period of time. Unfortunately, there is no way of preventing periodic intermenstrual pains altogether except by such unwarrantedly drastic means as the use of large doses of estrogens or androgens to suppress menstruation, irradiation of the ovaries or hysterectomy.

NONTHROMBOCYTOPENIC PURPURA

To the Editor:—A patient has marked fragility of the blood vessels. All tests, including prothrombin, are normal. He does well on excessive doses of ascorbic acid but it seems to help only temporarily. I will appreciate it if you can give me any help in this case.

William V. Vander Voort, M.D., Battle Creek, Mich.

ANSWER.—With the data at hand, this case would probably fall into the classification of nonthrombocytopenic purpura. Treatment depends on discovering the cause. Many cases are secondary to infection, drugs, allergic conditions or endocrinopathies. Frequently no cause can be discovered. Many forms of treatment have been suggested for the variety of unknown cause, but none are effective in more than a small percentage of cases.

TREATMENT OF CAVERNOUS HEMANGIOMA OF LIP

To the Editor:—A boy aged 5 years has a vascular nevus (cavernous type) involving the right half of his upper lip. It is quite noticeable as a bluish discoloration and swelling along the mucous membrane of the lip and extends upward from mucous membrane about 1 inch. Inside the lip the enlarged vessels are quite prominent and not unlike the appearance of hemorrhoids. Two years ago I ligated and excised a portion of one of the most prominent veins. This greatly improved the appearance of the lip, but there has been an increase in the prominence of the veins during the last year. What method of treatment is recommended for this condition? Would the injection of quinine and urea hydrochloride or sodium morrhuate, as used in the treatment of hemorrhoids, be of value in this condition? Would there be any contraindication or danger in using them in the mouth?

M.D., Illinois.

ANSWER.—The best method of treatment in a case such as this would be with radium in skilled hands. The injection treatment of cavernous hemangiomas (Light, S. E.: The Injection Treatment of Cavernous Hemangiomas, *Arch. Dermat. & Syph.* **24**:992 [Dec.] 1931); is not advised in a lesion of the upper lip because of the danger of baneful sequelae if an accidental extravascular injection was made and an inflammatory reaction with sloughing took place. The majority of patients with angiomas may be successfully treated with radium.

FISSURE OF LIP

To the Editor:—A boy aged 17 has a midline fissure of three years' duration on both the upper and the lower lip. Many ointments, the cautery and other measures have been tried, and he has had three applications of radium by a competent radium therapeutist. It is now three months since treatment, and there has been no improvement. More radium therapy has been advised, but because there has been no healing I have cautioned against this. I have contemplated the removal of the fissure and the underlying scar and shifting the center of the lip about ¼ inch (0.6 cm.) to one side. Any suggestion for treatment and comment on irradiation and possible surgical treatment will be appreciated.

M.D., Kimball, Neb.

ANSWER.—Assuming that the patient has negative serologic reactions for syphilis, the fissures probably did not heal because of the fibrosis laid down by the original infection. More scarring, with further diminution in local circulation, has undoubtedly followed the radium therapy. With the foregoing facts in mind, more irradiation should not be given. The lesions will probably heal with primary union if they are excised back to healthy tissue and the edges of the wound sutured. Notching the vermilion borders as in the Mirault cleft lip operation gives a better cosmetic result.

DECREASE OF POTENCY IN MAN OF SIXTY

To the Editor:—What treatment would you suggest for a partial loss of power of erection in a 60 year old man? Several years ago he had an attack of mumps with orchitis and atrophy of one testis. Ever since then he has had weak erections and premature ejaculations. Libido is normal. Please discuss the use of Oreton in this case. Would injections of Lyden Harrower be of use?

M.D., Virginia.

ANSWER.—The proper approach to a case like this is to perform a complete physical examination. Patients who suffer from organic disease may have symptoms referred to the sexual organs; for example, beginning tabes, pernicious anemia, leukemia or Banti's disease. The common cause of loss of power of erection in a man of 60 years is age, and this patient may be older for his years than he should be. Patients with this symptom may suffer from benign hypertrophy of the prostate, chronic prostatitis, chronic seminal vesiculitis and the like. Therefore, in addition to a really complete physical examination a local examination is in order.

Oreton or Lyden Harrower cannot be recommended.

VERNES' TEST FOR SYPHILIS

To the Editor:—Why is it that the Vernes test for syphilis, involving direct measurement of pallidin from the blood and the use of perethynol, has not been more widely adopted? French authorities emphasize its value because it gives exactitude in diagnosis and helps in prognosis and as a guide for treatment. Are there any scientific and well grounded reasons that prevent its common use in laboratories?

Eduardo Labastida K., M.D., Los Mochis, Sinaloa, Mexico.

ANSWER.—Unquestionably the main reason why the Vernes test for syphilis has not been adopted on a wide scale is that it is not as dependable as other available tests. Dr. Vernes participated in the serologic conference of the League of Nations Health Organization held at Copenhagen in 1928. His test, to which he refers as the syphilimetric method, proved in his own hands to be of extremely low sensitivity and not entirely specific. In addition, the technic of the test is highly complex and requires costly apparatus.

BEE STING AND DETACHED RETINA

To the Editor:—Can a bee sting to the upper lid produce a detachment of the retina? Reason: A man is stung by a bee on the upper lid. He states that he noted loss of vision following this. However, not until four days later did he see a physician. The physician noted only slight swelling of the upper lid and no signs of irritation or inflammation on the globe. The patient is now making a claim for compensation.

Leonard A. Hulsebosch, M.D., Glens Falls, N. Y.

ANSWER.—It is extremely improbable that there could be a causal relationship between a bee sting of the eyelid and a detachment of the retina. As nearly 50 per cent of the cases of retinal detachment are of unknown etiology, it has become somewhat of a habit to attribute a retinal detachment to any sort of a trauma within 18 inches of the eye, almost regardless of the time of occurrence. It would be fairly safe to say that in the instance cited the bee sting is not related to the retinal detachment.

ROENTGEN RAYS FOR LOCALIZED HYPERHIDROSIS

To the Editor:—A healthy single woman aged 23 complains of increased foul perspiration, especially in her arm pits, for seven months. Before coming to me she had six roentgen ray treatments beneath her arms at two week intervals for the first four, and then monthly, and she has appointments for more. The roentgen therapy did not affect the axillary hair, nor did she improve. She appears to be neurotic. Are roentgen ray treatments beneath the arms a recognized and efficacious treatment for excess perspiration? Would the roentgen rays affect the sweat glands and still leave the hair intact?

M.D., New York.

ANSWER.—Yes, roentgen therapy is recognized as a safe and efficient treatment of localized hyperhidrosis, affecting the sweat glands without any ill effect on the hair. It is assumed that the treatment is given with proper precautions by a competent roentgen therapist, who should be a dermatologist. See MacKee, G. M.: X-Rays and Radium in the Treatment of Diseases of the Skin, ed. 2, Philadelphia, Lea & Febiger, 1927, page 545.

GLAUCOMA AND FEVER

To the Editor:—A patient aged 73 who has glaucoma of the right eye has a temperature of 99.2 to 100.3 F. every night. Is this commonly due to glaucoma, or do patients usually have a fever with this condition?

M.D., Massachusetts.

ANSWER.—A temperature of 99 to 100.3 F. is certainly not due to glaucoma. Fever never seems to be caused by glaucoma itself. The presence of such a rise in temperature would suggest some other source of infection which might itself be a possible factor in producing a secondary type of glaucoma. It is doubtful, however, that it would be any factor in glaucoma of a simple noninflammatory type.

POSITION OF INFANT IMMEDIATELY AFTER BIRTH

To the Editor:—Following normal delivery of a child with some mucus in its mouth and the use of suction, in what position should the child be placed, temporarily, head or feet down?

M.D., New Jersey.

ANSWER.—It is good practice to hold the head of the baby down as it is delivered, so that it will more easily clear its air passages during the initial respiratory efforts. Once the air passages have been cleared and there is no respiratory embarrassment, the head of the baby need be neither up nor down.

DOUBLE-YOLKED HEN'S EGGS

To the Editor:—We sometimes find an egg with a double yolk. When such an egg hatches, what is the nature of the progeny?

Robert T. Morris, M.D., Stamford, Conn.

ANSWER.—Double-yolked hen's eggs are not uncommon. When such eggs are fertilized, the two yolks develop separately as a pair of fraternal twins. Because of crowding in the later stages of embryonic development, however, they rarely if ever hatch as two living normal chicks.

ADENINE SULFATE

To the Editor:—In the January 24 issue of *The Journal*, page 338, the statement is made that adenine sulfate is difficult to obtain and probably can be had only for experimental purposes. I have had no difficulty in obtaining adenine sulfate from the Eastman Kodak Company, Rochester, N. Y., in 10 Gm. lots or less. May I also correct the sentence "Reactions do occur when it is used intravenously." The only reaction obtained with this product is local irritation if some of the material is injected around the vein. In my experience, no constitutional reactions have been obtained. I agree with you that the diagnosis of acute agranulocytosis in the case in question is improbable for the reason you mention. I also believe that none of the remedies suggested have been proved to be specific.

Paul Reznikoff, M.D., New York.